Identity and Emotions

An Overlooked Link

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Chapter 1

Introduction

Adolescents face the task of forming an identity; they need to decide what profession to follow, to choose in which values to believe, to make up their minds on how to relate with important others in their lives, and to accept themselves the way they are. Although originally part of a broader theory of lifespan development (Erikson, 1980), identity soon became an independent concept. Relevant theory and research accentuate the role of problem-solving and decision-making variables in the formation of identity. This dissertation suggests an alternative process that goes beyond problem solving and decision making. Emotions play a central role in this process.

Commitments and their Characteristics

As Erikson (1959) himself admitted, identity was not defined specifically enough in his writings. Therefore, different researchers have focused on different aspects of identity and have come up with different operationalisations thereof. For instance, van Hoof (1998) focused on the structural integration of identity, while Blasi and Milton (1991) looked at the subjective sense of self. The most popular of these operationalisations, having led to more than 500 publications by the end of the last decade (Waterman, 1999), is the identity status paradigm (Marcia, 1966).

Following Marcia, identity is reflected on the ways individuals commit themselves in important areas in their lives. Originally, these areas were philosophy of life (religion and politics) and future occupation (Marcia, 1966). Later, Rogow, Marcia, and Slugoski (1983) suggested that other personally relevant areas should be studied as well. Examples of such areas are standards of sexual behaviour (Marcia & Friedman, 1970), family- career priorities (Archer, 1989), friendship and dating (Grotevant & Adams, 1984), parents and personal characteristics (Bosma, 1985).

In his original publication, Marcia (1966) referred to one main characteristic of commitments, namely their strength. He defined it as “the degree of personal investment” (p. 551) of the individuals in their beliefs or decisions. Typically, this is measured by means of items such as “Are you satisfied with your commitment?” (Bosma, 1985) and “My commitment gives me self-confidence” (Meeus, 1996). Later, Bosma (1985) suggested that the content of the commitments, referring to the beliefs or decisions themselves, is also important (also Kroger, 2003).

Formation of Commitments

In the identity status paradigm, commitments are formed following “a period of engagement in choosing among alternatives” (Marcia, 1966, p. 551), the so-called exploration. The precise meaning of exploration is equivocal. Meilman (1979) defined it as “the process of rethinking one’s position” (p. 230), and

Bosma (1985) concluded that it includes the "active orientation to other persons… and an attempt to come to a new commitment" (p. 140). In these definitions, exploration functions in breadth and aims at forming new commitments. Following Meeus, Iedema, and Maassen (2002), exploration functions in depth and aims at maintaining and validating existing commitments. Luyckx, Beyers, Goossens, and Soenens (2004) integrated both views: Exploration in breadth leads to the formation of commitments, and exploration in depth promotes identification with already formed commitments. In all relevant operationalisations and definitions, exploration refers to the active and deliberate thinking through or into alternatives.

Researchers have soon acknowledged that the identity status paradigm is outcome-oriented. Berzonsky (1990), Kurtines (see Berman, Schwartz, Kurtines, & Berman, 2001), and others have suggested cognitive components of exploration in an attempt to introduce a process perspective in the identity status concept. Grotevant (1987), however, warned that rational models might not capture the essence of identity formation. Instead, he suggested that "individuals who explore possibilities [are] pragmatic, anticipating and testing out possible results of choices, rather than systematically testing their compatibility with each possible option" (pp. 210-211). In his model, based on mate selection literature, he introduced affective components as inextricable parts of the exploration process.

Identity and Emotions

Emotions and identity are related in various ways (Bosma & Kunnen, 2001; Haviland, Davidson, Ruetch, Gebelt, & Lancelot, 1994; Strayer, 2002). Here, we will refer only to emotions as connected to commitments (and their formation). In literature, negative emotions, such as distress (Adams & Marshall, 1996) and anxiety (Archer & Waterman, 1994), trigger the exploration process. Once activated, exploration involves feelings of anxiety and uncertainty (also Archer & Waterman, 1994), of challenge or discouragement as a result of perceived failure, of satisfaction as a result of success, and of sadness "over opportunities foregone even when desired choices are made" (Grotevant, 1987, p. 213). Positive emotions promote exploration and new ways of looking at things (Isen, 1993). The satisfaction derived from commitments determines whether and to what extent exploration will be initiated in the future (Grotevant, 1987).

A different view of the role of emotions in identity is given in the construct of personal expressiveness (Waterman, et al., 2003). Drawing from the Aristotelian concept of eudaimonia, Waterman suggested that feelings of personal expressiveness (positive emotions) are related to "activities that reflect one's core sense of being" (Waterman, et al., 2003, p. 1449). Personal expressiveness is reflected, among others, in feeling intensely alive, feeling

complete or fulfilled, and feeling that this is who one really is (for a fuller account of the concept of eudaimonia, Waterman, 1993). Although the aforementioned lines of reasoning root from different perspectives on the formation of identity (construction *vs.* discovery; Waterman, 1984), they both allow for the possibility to find links between identity and emotions.

Overview of Chapters

The present dissertation focuses on how emotions inform on the process of commitment formation. The major questions that guided the research reported are: Should we exclusively focus on rational aspects of commitment formation? In what way can emotions be related to this process? The forthcoming chapters deal with these questions.

Chapter 2 questions the emphasis of research on the rational aspects of commitment formation. An example of such aspects is the concept of identity styles, which refer to the social cognitive strategies that individuals supposedly use when approaching identity issues (Berzonsky, 1990). We used psychological well-being (Ryff, 1989) as an index of what matters for the individuals. Regression analyses show that being committed is important for one's well-being, but the way of reaching these commitments, i.e., their identity style, is not. This is a first sign that the focus on the rational aspects of identity formation solely might be misleading.

Chapter 3 questions the emphasis of literature on exploration as the process of change and stability of commitments. We use the domain of parents as an example of an identity domain where exploration may not explain changes and stability of commitments. Our data show that exploration hardly ever occurred, and, even when it did, it could not explain the course of commitments. On the other hand, positive and negative emotions with respect to parents explain it. In Chapter 4, we build a dynamic systems model to predict the course of commitments towards parents based on friends-related emotions. We exhibit the viability of the model through empirically testing it. The essence of this chapter is that even experience not directly related to an identity area may affect the commitments regarding this area.

Chapter 5 considers the course of a different identity domain, namely that of personal characteristics, which can easily be related to self as well as to identity literature. We build a dynamic systems model to describe the course of maturity of one's commitment towards personal characteristics based on emotions related to friends, parents, perceived competence and incompetence, and reflections towards oneself. Empirical data provide support to this model. Finally, in Chapter 6, we discuss the importance of the findings presented in Chapters 2 to 5 for the theory on commitment formation, the strengths of these studies, and directions for future research.

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Chapter 2

Are Identity Style Important for Psychological Well-Being?

ABSTRACT

A successful identity formation is related to being psychologically well (Erikson, 1963). This link seems to be lost in the identity style literature that focuses either on the maturity of the identity styles, or on adaptive and maladaptive behaviour correlates of identity styles. In this study, we address this lost link. We administered the Identity Style Inventory (Berzonsky, 1992a) and the scales of Psychological Well-Being (Ryff, 1989) to 230 Hellene University students. The Hellenic translations of the scales functioned appropriately. The findings suggest that, first, avoiding facing identity issues is negatively related to psychological well-being, and, second, when such issues are faced, the way of facing them is not important.

This chapter is based on:
Vleioras, G. & Bosma, H. A. (2005). Are identity styles important for psychological well-being? *Journal of Adolescence.*

INTRODUCTION

Adolescents face the task of forming an identity: They need to make up their minds on important issues in their lives, such as what profession to follow, in what religion to believe, or what political ideas to adopt. They may approach such issues in different ways. For instance, they may gather information and make decisions accordingly, or they may adopt the guidelines set forth by significant others. This study addresses whether the way of approaching identity issues is important for the well-being of individuals.

Identity, Identity Status, and Identity Styles

Identity formation is the successful resolution of the so-called identity crisis, presented in Erikson's (1982) psychosocial theory. Erikson described development as a series of conflicts faced at different ages, which result from the interplay between the social environment and individual growth (Erikson, 1963). The success or failure of resolving each conflict affects the success of resolving future conflicts (this principle is known as the epigenetic principle). Successful resolution of the conflicts is related to the emergence and re-emergence of an increased sense of inner unity, and an increase of good judgement and of the capacity of doing well (Erikson, 1980).

As Erikson (1959) himself admitted, the content of identity has not been very specific in his theory. Therefore, different operationalisations have been suggested (e.g., Blasi & Milton, 1991; Van Hoof, 1998). From these, the identity status paradigm, introduced by Marcia (1966), proved to be the most famous and research inspiring one. Marcia (1966) described four "individual styles of coping" (p. 558) with the identity formation task, and called these identity statuses. Individuals are assigned to these statuses on the basis of the degrees to which they have explored or are exploring identity alternatives and to which they are committed to one of these alternatives.

Identity achievers and foreclosures are both committed: The former have firstly explored identity alternatives, while the latter have not done so. On the other hand, moratoriums and diffusions are not committed: The former are now in the process of exploring, while the latter have not explored identity alternatives. Extrapolating from Erikson's theory, we would expect identity achievement and foreclosure to be developmentally more favoured than moratorium and diffusion, because the former involve having made commitments. This is only partly true: In the identity status literature, identity achievement is a mature and diffusion an immature status (Meeus, Iedema, Helsen, & Vollebergh, 1999); moratorium, however, is considered more mature a status than foreclosure (Waterman, 1982). Therefore, it appears that, in the identity status paradigm, the interest is diverted from holding commitments to exploring identity alternatives.

Although exploration refers to the process of identity formation, the identity status paradigm itself is rather outcome-oriented. Acknowledging this, Berzonsky (1990) proposed the idea of identity styles to describe the social-cognitive strategies individuals use to face identity issues. An information orientation involves actively seeking out, elaborating, and evaluating relevant information in order to form commitments. A normative orientation involves a focus on the normative expectations held for the individuals by significant others. Finally, a diffuse/avoidant orientation refers to avoiding the confrontation of identity issues for the longest possible. Extensive research (Berzonsky & Adams, 1999; Berzonsky, 2002) has shown that identity achievers and moratoriums use mainly an information orientation, foreclosures a norm orientation, and diffusions a diffuse/avoidant orientation. In accordance with the aforementioned idea on the maturity of identity statuses, an information orientation is considered the maturest identity style, a diffuse/avoidant orientation the least mature, and the norm orientation lies in between (Berzonsky, 1990).

Identity Styles and Well-Being

As we mentioned before, Erikson inextricably related the developmentally desirable outcome of identity formation with one's good judgement, sense of inner unity, and capacity of doing well, what can be readily identified as characteristics of somebody being psychologically well. On the other hand, the theory behind identity styles refers to their maturity, but not to their outcomes in terms of being well. This gap is partly covered by several studies that addressed whether identity styles are differentially related to indices of well-being.

An information orientation is related positively to successful coping with stress and anxiety, to problem-focused coping, and to openness to experience, and negatively to other-directedness, to debilitative effects of anxiety, to reliance to wishful thinking, and to emotional distancing. On the other hand, a diffuse/avoidant orientation is related negatively to quality of peer relationships, to academic achievement, and to self-esteem, and positively to debilitative effects of anxiety, to emotional distancing, to other-directedness, to maladaptive decisional strategies, to drugs and alcohol problems, to depressive reactions (Nurmi, Berzonsky, Tammi, & Kinney, 1997), to neuroticism, and to eating and conduct disorders (for reviews, see Berzonsky, 1990, 2002, 2003).

While information orientation is clearly positively related to well-being and diffuse/avoidant orientation is clearly negatively related to well-being, the relationship of normative orientation and well-being is not clear-cut. Thus, similarly to information orientation, it is positively related to effective behaviours, while, similarly to diffuse/avoidant orientation, it is also

positively related to emotional avoidance and to debilitative effects of anxiety (Berzonsky, 1992b). Lastly, unlike information orientation, it is negatively related to problem-focused coping and to openness regarding core areas of the self (Berzonsky, 1990).

In conclusion, previous research on identity styles and well-being has mainly relied on indices of adaptive and maladaptive behaviours, and on negative indices of well-being. These seem to be only fragments of what Erikson described as characteristics of being well. We here suggest that the model of psychological well-being suggested by Ryff (1989) may prove useful in this respect.

Psychological Well-Being

Starting from the conviction that "positive health is more than the absence of illness" (Ryff & Singer, 1998, p. 1), Ryff (1989) suggested that psychological well-being comprises what one needs to be psychologically well (contrast the notion of subjective well-being, which refers to feeling well), which is highly parallel to the characteristics of a healthy personality set forth by Erikson. In order to define the criteria of psychological well-being, Ryff reviewed the works of Maslow on self-actualisation, of Rogers on the fully functioning person, of Jung on individuation, of Allport on maturity, of Erikson on his psychosocial model, of Buhler on the basic life tendencies, of Neugarten on personality change in adulthood, and of Jahoda on the positive criteria of mental health (Ryff, 1989; Ryff & Singer, 1996).

Ryff (1989) concluded that they all converge in the following criteria: holding a positive opinion about oneself (self-acceptance), being able to choose or create contexts appropriate for one's psychological condition (environmental mastery), having warm and trusting relationships and being able to love (positive relations with others), having goals, intentions, and a sense of direction (purpose in life), continuous development of one's potential (personal growth), and being self-determined and independent (autonomy). These criteria are related positively to positive functioning (such as life satisfaction), and negatively to negative functioning (such as depression; Ryff & Singer, 1996). Finally, they are also related to biological health (Ryff & Singer, 2002).

Aim of the Present Study

Based on previous research presented above and on the link between measures of psychological well-being and of other measures of well-being, it would be reasonable to form a research hypothesis on possible links between identity styles and psychological well-being. However, because of the conceptual difference between the indices of well-being used before and the

psychological well-being, we prefer to formulate a research question: Are identity styles related to psychological well-being?

METHOD

Participants

Participants were 230 (43 male, 187 female) Hellene[1] University students. The high proportion of females is typical for psychological, classical, and theoretical studies in the Hellenic Republic. Their age ranged from 18 to 23 years (mean = 20.13, s = 1.59). The sample comprised 148 (64.3%) psychology students, 22 (9.6%) students of classical or theoretical studies, and 60 (26.1%) students of applied sciences. Fifty- two (22.6%) were in the first year of studies, 51 (22.2%) in the second, 70 (30.4%) in the third, 32 (13.9%) in the fourth, and 25 (10.9%) in the fifth or later. No reward was given for participating in the study.

Measures

Identity styles

We used the Identity Style Inventory (Berzonsky, 1992a). This 40-item inventory contains four scales: an information, a normative, and a diffuse/avoidant orientation scale, and an index of the strength of commitment. The psychometric qualities of the original version are satisfactory (Berzonsky, 2003). The Identity Style Inventory was translated into the Hellenic language. Some items were re-formulated to better fit the Hellenic educational system. The internal reliability coefficients (alphas) for the identity style scales in this sample were acceptable (0.63, 0.62, and 0.66, for the information, normative and diffuse/avoidant orientation, respectively), but lower than the ones reported for the original version (Berzonsky, 1992a). Eliminating items only slightly improved these coefficients. Therefore, we retained the original scales. The alpha coefficient for the commitment index was 0.68, acceptable, and comparable to that reported for the original version (Berzonsky, 1992a).

Psychological well-being

We used the Psychological Well-Being scales devised by Ryff (1989). These are six 14-item scales, measuring the psychological well-being dimensions of Ryff's (1989) model: self-acceptance, environmental mastery, positive relations with others, purpose in life, personal growth, and autonomy (for a description of these scales, Table 1). The psychometric qualities of the original

[1] Hellene, Hellenic, and Hellenic Republic are the proper terms for Greek (person), Greek (object), and Greece

version are satisfactory (Ryff, 1989). These scales were translated into the Hellenic language. The internal reliability coefficients (alphas) in the present sample ranged from 0.77 to 0.86, and were slightly lower than the ones reported for the original version (Ryff, 1989). Eliminating items only slightly increased these coefficients. Therefore, the original scales were used.

Table 1. Content of the psychological well-being scales.

A high score in:	Shows:
Self-acceptance	positive attitude toward the self; acknowledgement and acceptance of multiple aspects of self including good and bad qualities; feeling positive about past life
Environmental mastery	sense of mastery; competence in managing the environment; control of a complex array of external activities; effective use of surrounding opportunities; ability to choose or create contexts suitable to personal needs and values
Positive relations with others	warm, satisfying, trusting relationships with others; concern about the welfare of others; capability of strong empathy, affection, and intimacy; understanding of give and take of human relationships.
Purpose in life	goals in life and sense of directedness; feeling there is meaning to present and past life; beliefs that give life purpose; aims and objectives for living
Personal growth	feeling of continued development; seeing self as growing and expanding; openness to new experiences; seeing sense of realising one's potential; seeing improvement in self and behaviour over time; change in ways that reflect more self knowledge and effectiveness
Autonomy	self-determination; independence; ability to resist to social pressures to think and act in certain ways; regulation of behaviour from within; self-evaluation by personal standards

Procedure

The first author approached the participants in their faculties, informed them about the study, and asked them to fill in a battery consisting of a sheet on demographic characteristics, the two aforementioned questionnaires, and a

personality questionnaire. The order of the questionnaires in the battery was randomised. The participants were free to choose whether to fill in the battery immediately, or take it at home and return it to the researcher later.

RESULTS

Preliminary Analyses

This is the first time that the Identity Style Inventory and the Psychological Well-Being scales were used in the Hellenic language. Therefore, we first present some preliminary analyses to compare the behaviour of the Hellenic to the original versions of the questionnaires.

Intercorrelations

Table 2 exhibits the intercorrelations between the identity style, strength of commitment, and psychological well-being scales. Unlike previous research (Berzonsky, 1992c), the identity styles did not correlate with each other. Similarly to previous research (Berzonsky, 1992c), strength of commitment correlated with all three identity styles: The higher the strength of commitment, the higher the score in the information and normative orientations, and the lower the score in the diffuse/avoidant orientation. All psychological well-being scales positively correlated with each other. The direction and significance of these correlations are comparable to previous research (Kling, Seltzer, & Ryff, 1997). Despite the magnitude of these correlations, Ryff and colleagues (Ryff, 1989; Ryff & Keyes, 1995) advise not to sum all psychological well-being scales into one general scale, because they represent distinct facets of positive mental health. Finally, the information orientation positively correlated with all psychological well-being except for self-acceptance, the normative orientation positively correlated with environmental mastery, the diffuse/avoidant orientation negatively correlated with all psychological well-being scales, and the strength of commitment positively correlated with all psychological well-being scales.

Gender and age differences

At this preliminary level, we conducted only univariate analyses. We calculated bivariate correlations to test for age effects, and conducted t-tests to test for gender differences. As far as psychological well-being is concerned, age positively correlated with autonomy, $r\ (224)=0.16$, $p<0.05$. Previous research found more age differences, but, in those studies, wider age groups were compared (such as young *vs.* middle-aged *vs.* old-aged individuals; Ryff, 1989). In accordance with previous findings (Ryff, 1995), women scored higher than men in positive relations with others and in personal growth, $t\ (225) = -3.54$, $p<0.001$ and $t\ (226) = -3.67$, $p<0.001$, respectively. Unlike

previous findings, they also scored higher in purpose in life, $t(225) = -3.13$, $p<0.01$. No age or gender differences were found regarding identity styles. This is in accordance with the identity style theory (Berzonsky, 1990), according to which, by late adolescence, all individuals are capable of using all three identity styles.

In sum, the Hellenic versions of the Identity Style Inventory and the Psychological Well-Being scales behave by and large similarly to the original versions: Identity style and psychological well-being scales intercorrelate in the expected way (except for the absence of correlation between information and diffuse/avoidant orientation), and comparisons between age groups and genders roughly replicate previous findings.

Are Identity Styles Related to Psychological Well-Being?

The research question of this study is whether identity styles are related to psychological well-being; in other words, whether identity styles are significant predictors of psychological well-being, in the statistical sense. Because the psychological well-being scales correlated with each other, a multivariate GLM analysis was conducted. This gave the same results as a series of univariate regression analyses (simultaneous regression of each psychological well-being scale on the identity style and strength of commitment scales). For reasons of ease of interpretability, only the latter analyses will be presented. To account for the increase in the risk of a type I error, due to conducting multiple analyses, we used a significance cut-off level of 0.01.

Although our research question refers to the identity styles only, the strength of commitment was also included in the analyses. On a conceptual level, information and normative orientations are related to having commitments (high score in strength of commitment), while the diffuse/avoidant orientation is related with not having commitments (low score in strength of commitment). Strength of commitment, on the other hand, significantly correlated with all psychological well-being scales (see Preliminary analyses- Intercorrelations). Accordingly, it may be that information and normative orientations are positively related to psychological well-being because they lead to making commitments, and that the diffuse/avoidant orientation is negatively related to psychological well-being because it results in lack of commitments. Including the strength of commitment in the analyses secured that such effects would be controlled for.

Table 3 summarises the results of the regression analyses. Eliminating outliers did not alter the results, and multicollinearity problems were not detected. The diffuse/avoidant orientation was a significant predictor of environmental mastery, positive relations with others, purpose in life, and

Table 2. Intercorrelations between the identity style, the strength of commitment, and the psychological scales (N=230).

Variables	A	B	C	D	E	F	G	H
Identity scales								
A. Information orientation								
B. Normative orientation	0.13							
C. Diffuse / Avoidant orientation	-0.11	0.09						
D. Strength of commitment	0.32***	0.39***	-0.34**					
Psychological Well-Being Scales								
E. Self-acceptance	0.12	0.01	-0.30***	0.43***				
F. Environmental mastery	0.17*	0.14*	-0.37***	0.44***	0.67***			
G. Positive relations with others	0.17**	0.08	-0.30***	0.38***	0.48***	0.42***		
H. Purpose in life	0.16*	0.06	-0.52***	0.54***	0.61***	0.60***	0.39***	
I. Personal growth	0.35***	-0.10	-0.31***	0.35***	0.46***	0.40***	0.52***	0.55**
J. Autonomy	0.14*	-0.09	-0.22***	0.18**	0.45***	0.39***	0.15*	0.22**

* $p<0.05$
** $p<0.01$
*** $p<0.001$

personal growth: The higher the score in the diffuse / avoidant orientation, the lower the score in these psychological well-being scales. The information and normative orientations were significant predictors only in the case of personal growth: The higher the score in information and the lower the score in normative orientation, the higher the score in personal growth. Including interaction effects between age and identity styles did not significantly add to the model.

Table 3. Betas, standardised errors, standardised betas, and significance levels for the multiple linear regression analyses of each of the psychological well-being scales vs. identity style and strength of commitment

Psychological well-being scales	Independent variables	Beta	Std. Error	Std. Beta	*p*
Self-acceptance	Information	-0.04	0.14	-0.02	n.s.
	Normative	-0.33	0.16	-0.14	n.s.
	Diffuse / avoidant	-0.28	0.13	-0.14	n.s.
	Commitment	0.96	0.16	0.46	<0.001
Environmental mastery	Information	0.05	0.12	0.03	n.s.
	Normative	0.08	0.12	0.04	n.s.
	Diffuse / avoidant	-0.44	0.11	-0.26	<0.001
	Commitment	0.61	0.13	0.34	<0.001
Positive relations with others	Information	0.15	0.14	0.07	n.s.
	Normative	-0.03	0.15	-0.02	n.s.
	Diffuse / avoidant	-0.36	0.13	-0.19	<0.01
	Commitment	0.60	0.15	0.30	<0.001
Purpose in life	Information	0.00	0.11	-0.00	n.s.
	Normative	-0.11	0.11	-0.06	n.s.
	Diffuse / avoidant	-0.65	0.10	-0.38	<0.001
	Commitment	0.81	0.11	0.44	<0.001
Personal growth	Information	0.41	0.10	0.26	<0.001
	Normative	-0.36	0.10	-0.23	<0.001
	Diffuse / avoidant	-0.23	0.09	-0.17	<0.01
	Commitment	0.47	0.10	0.33	<0.001
Autonomy	Information	0.19	0.15	0.09	n.s.
	Normative	-0.31	0.16	-0.14	n.s.
	Diffuse / avoidant	-0.23	0.14	-0.12	n.s.
	Commitment	0.34	0.16	0.17	n.s.

A series of hierarchical regression analyses was conducted to check whether information and normative orientations were not significant predictors in the rest of the psychological well-being scales because of shared variance in prediction. Each of the psychological well-being scales (except for the personal growth) has been hierarchically regressed first on the

diffuse / avoidant orientation and the strength of commitment, and then on all three identity styles and strength of commitment. The R^2 values of the two models were compared. In none of the analyses did the inclusion of the normative and information orientation significantly add to the R^2 (Table 4).

Table 4. Summary of hierarchical regression analyses of each psychological well-being scale on diffuse / avoidant orientation and strength of commitment (model 1) and on information, normative, and diffuse / avoidant orientation and strength of commitment (model 2)

Psychological well-being scales	Model	R square	Adjusted R square	R square change	Significance of F-change
Self-acceptance	1	0.22	0.21	0.22	<0.001
	2	0.24	0.22	0.02	n.s.
Environmental mastery	1	0.26	0.26	0.26	<0.001
	2	0.26	0.25	0.00	n.s.
Positive relations with others	1	0.18	0.17	0.18	<0.001
	2	0.18	0.16	0.00	n.s.
Purpose in life	1	0.43	0.43	0.43	<0.001
	2	0.44	0.43	0.00	n.s.
Autonomy	1	0.06	0.05	0.06	<0.01
	2	0.08	0.07	0.02	n.s.

Note: The R square change describes the explained variable added by every new model. For model 1, it equals the respective R square because the R square for a hypothetical model with no dependent variables is 0. For model 2, it equals the R square of model 2 minus the R square of model 1. The F-change tests whether the R square change is statistically significant.

CONCLUSION- DISCUSSION

Previous research has related identity styles with separate indices of well-being. This is the first study that related them with an integrated model of positive mental health. The diffuse / avoidant orientation was a significant predictor of the scores in four psychological well-being scales, and the information and norm orientations were significant predictors of the scores in only one psychological well-being scale. The strength of commitment was a significant predictor in all psychological well-being scales but one, and none of the identity styles was a significant predictor of that scale either. Thus, it appears that not dealing with identity issues is related to less psychological well-being, that dealing with identity issues (resulting in commitments) is related to more psychological well-being, but that the way individuals deal with identity issues is not related to psychological well-being.

As we described in the introduction, previous research relates diffuse / avoidant orientation with low well-being, and information

orientation with high well-being. Norm orientation is related both positively and negatively with different facets of well-being. In this study, only the negative connection between diffuse / avoidant orientation and psychological well-being was replicated. Why may this be the case? In previous research, the role of commitment was not taken into account. As Berzonsky (2003) showed, however, commitment does matter when it comes to the relationship between identity styles and well-being.

Some insight on the way it matters can be gained through the literature on identity statuses and well-being. The concept of commitment is inherent in the identity statuses, giving them a comparative advantage over identity styles. Reviewing relevant literature, Meeus (1996) and Meeus et al. (1999) concluded that achievers and foreclosures have the highest well-being, moratoriums have the lowest, and diffusions lie in between (also, Waterman, 1999). The fact that achievers and foreclosures are the highest in well-being signifies that, at least in terms of well-being, it is more preferable to have (than not to have) identity commitments, no matter how these were reached.

In the Results section, we suggested that one possible way through which the diffuse / avoidant orientation is negatively related to well-being is that the former leads to a lack of commitments, which is related to low well-being. This would mean that in hierarchical regression analyses, in which each of the psychological well-being scales would be first regressed on the identity style scales and then on the identity styles and strength of commitment scales, the diffuse / avoidant orientation would be a significant predictor of the psychological well-being scale only in step 1. This was true only for the self-acceptance scale. Diffuse / avoidant orientation predicted the scores in four psychological well-being scales beyond its effect on lacking commitments. According to the conceptualisation of this orientation (Berzonsky, 1990), it refers, among other things, to decisional and behavioural procrastination, which have been related to low well-being (Ferrari, 1991).

Two psychological well-being scales (namely, personal growth and autonomy) had distinct profiles in terms of identity styles. All three identity styles were significant predictors of scores in personal growth: The higher the score in the information orientation and the lower the scores in the normative and diffuse / avoidant orientations, the higher the score in personal growth. A high score in personal growth represents realising that one has the potential of continuous development and improvement over time (Table 1). This is possibly related to active decision-making (information orientation). On the other hand, relying on norms set forth by others (normative orientation) or not facing problems (diffuse / avoidant orientation) exhibits a rather passive perspective on development. That is, the identity styles reflect different perspectives towards one's potential for continuous development. Therefore, it is reasonable that they were all significant predictors of personal growth.

None of the identity styles or the strength of commitment were significant predictors of autonomy. That is, autonomy seems to be unrelated to both the process and the outcome of making commitments. As one can see in Table 4, however, the diffuse / avoidant orientation and the strength of commitment together did predict autonomy. This is concealed when inspecting the beta values of the individual variables. That is, it appears that the diffuse / avoidant orientation and the strength of commitment have shared variance in the prediction of autonomy. Therefore, inspecting the beta values of each identity style separately exhibits that none of them significantly predicts autonomy.

Some weak points of this study should be kept in mind before generalising these findings. First, the scores in some of the psychological well-being scales significantly differed between men and women. However, due to the small number of men in our sample, it was not feasible to test whether the observed relations with identity styles hold similarly in both genders (repeating the analyses in the female sample gave roughly the same results). A second limitation concerns the satisfactory but rather low internal reliability of the identity style scales. This is not a peculiarity of the Hellenic version, though; it appears that, in several studies (Berzonsky, 1992b; Clancy Dollinger, 1995), the alpha coefficients of the Identity Style Inventory are rather low. This points to problems in the operationalisation of the identity styles. Finally, heretofore, we implied that psychological well-being is the outcome variable. This is in line with previous research (Berzonsky, 2003; Nurmi, et al., 1997), but alternative causal relations are also plausible.

Despite these weaknesses, there are also some strong points that support the validity of this study. This paper represents a first attempt to translate and use the Identity Style Inventory and the Psychological Well-Being scales in the Hellenic language. Some preliminary analyses on the intercorrelations between the identity style, strength of commitment, and psychological well-being scales, as well as on age and gender differences in the aforementioned scales showed that these new versions behave satisfactorily. The size of the sample was adequate to test the regression models, given the number of variables included. The instruments used were carefully selected and adapted in the Hellenic language. Particular attention was paid when collecting the data, so that most inventories were fully completed. Finally, the data collected do not violate the assumptions of regression analysis (as presented in Miles & Shevlin, 2001).

In conclusion, when identity issues are approached, it makes no difference in terms of psychological well-being whether individuals seek answers themselves or adopt norms. Does this mean that we should deny the usefulness of identity styles as a whole? We are going to discuss three points with reference to this question. For a start, it may be that identity styles do not

appropriately capture the social-cognitive strategies used by Hellenes, since the Hellenic culture is much more traditional in terms of values than western European countries. For instance, the information orientation question "I've spent a good deal of time reading and talking to others about religious ideas" of the Identity Style Inventory (Berzonsky, 1992a) may be inapplicable in a country, where formal education includes a compulsory course on orthodox Christianity. On the other hand, there is evidence (e.g., Phillips & Pittman, 2004) that, in the American society as well, there is no link between identity styles and well-being.

Secondly, it may be useful to consider the operationalisation of the identity styles. As we already mentioned, the Identity Style Inventory suffers from low internal reliability. Furthermore, as Berzonsky (2002) himself asserts, his identity styles cannot be fully assessed by one single measure. Moreover, the Identity Style Inventory measures the extent to which individuals reportedly use the identity styles (see Berzonsky, 1992c), and not the extent to which they actually use them. Finally, many identity style items refer to the way of having dealt with identity issues, rather than of currently dealing with them (for the meaning of the present perfect tense, see Kirszner & Mandell, 2002). An alternative means of identity style measurement is the Current Identity Q-sort (Kerpelman, Pittman, Lamke, & Sollie, 2003), in which items are formed in the present term.

Lastly, it may be that identity styles are important for the psychological well-being in a different context. Literature (Berzonsky & Ferrari, 1996; Grotevant, 1987; Kunnen & Bosma, 2000; Magai & Hunziker, 1994) suggests that conflicts between identity and environmental input are causally related to identity change. Berzonsky (1992c) assumes that successful adaptation involves a balance between assimilative and accommodative processes that aim at reducing such conflicts. In the long run, he suggests, "information-based decisions will maximize adaptation" (Berzonsky, 1992c, p. 194). That is, identity styles may be relevant to psychological well-being in cases where individuals are exposed to environments that challenge their identities.

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Foreword to Chapters 3 to 5

As was already mentioned, Chapters 3 to 5 look into the processes of commitment change and stability. This is done in a context where identity changes are likely. Different sources (e.g., Erikson, 1968; Grotevant, 1987) stress the role of relational, communal, and cultural variables in identity formation. Starting from this, we chose a context that involves changes in culture, society, and relationships: the international exchange experience. The European Union initiated the Socrates programme in 1989 in order to encourage exchanges of students of all educational stages, professionals, and teachers between the countries-members of the European Union and several other European countries. A division of Socrates, the Erasmus programme,[2] concerns exchanges of undergraduate, postgraduate, and doctoral students across European Universities for 3 to 15 months.

What makes this experience interesting is that it inevitably involves two cultural transitions, within a relatively short period of time. Both transitions entail changes in societal data, since the individuals draw away from their familiar home society, and enter a new, the host one, within which they will typically interact with other international students. Furthermore, Erasmus students have to deal with going away from important others (relatives, friends) and starting new relationships ex nihilo. Although this experience is neither usual nor normative, we assume that the mechanism lying behind commitment formation will be the same as in "normal" life.

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[2] http://europa.eu.int/comm/education/programmes/socrates/erasmus/activity_en.htm#mo

Chapter 3

Predicting Change in Relational Identity Commitments: Exploration and Emotions

ABSTRACT

Exploration has long been assumed to be the primary mechanism behind changes in identity commitments. Conceptual and operational definitions of exploration emphasize the active role of the individual. In addition to this mechanism, we propose a model based on emotions to explain changes in relational identity commitments. To investigate the viability of this model, four individuals (aged 20-22 years) reported daily identity-relevant experiences for 5 months. The Groningen Identity Development Scale (Bosma, 1985) and a variant thereof were administered at the beginning and end of this period, respectively. The results challenge the primacy of exploration as a mechanism behind commitment changes, and reveal an important role for emotions in such changes.

This chapter is based on:
Vleioras, G. & Bosma, H. A. (2005). Predicting change in relational identity commitments: Exploration and emotions. *Identity, 5* (1), 35-56.

INTRODUCTION

Forming an identity is the major developmental task during the transition to adulthood (Erikson, 1950). In the best-known operationalization of identity, the identity status paradigm, Marcia (1966) suggested looking at the commitments individuals make in respect to occupation and ideology. Later, Rogow, Marcia, and Slugoski (1983) suggested that any personally relevant issue can be used from the perspective of the identity status paradigm. Following this suggestion, the identity status paradigm has been applied in various identity issues. However, the question of whether the same processes of commitment formation apply to all such domains has not been addressed.

Commitments

Characteristics and formation

Two basic characteristics of commitments are their strength and their content. Strength of commitment refers to "the degree of personal investment" (Marcia, 1966, p. 551) in beliefs or decisions regarding important fields in people's lives, the so-called identity domains. The content of commitments (such as an occupational plan) refers to the beliefs or decisions themselves (Bosma, 1985; Kroger, 2003).

According to Marcia (1966), late adolescents are expected to commit themselves in respect to occupation and ideology. Optimally, they form such commitments after a period of engaging themselves in exploration. Starting with Marcia, exploration has received considerable attention as a basic process underlying commitment formation (Berman, Schwartz, Kurtines, & Berman, 2001; Grotevant, 1987). However, its definition as well as its function has varied among researchers.

Initially, Marcia (1966) defined exploration as a "period of engagement in choosing among alternatives" (p. 551). Later, he (Marcia, 1967) stressed the individual's active role in so doing. Meilman (1979) defined exploration as "the process of rethinking one's position" (p. 230), and Bosma (1985) concluded that it includes the "active orientation to other persons … and an active attempt to come to a new commitment" (p. 104). For Meeus, Iedema, and Maassen (2002), as well, exploration refers to actively dealing with commitments, but its function is the maintenance and validation of existing commitments, rather than the formation of new ones. A common theme in most definitions, then, is the active role of individuals in gathering information and making decisions.

Commitments in relational domains: Identity vs. intimacy

Following the reasoning by Rogow, et al. (1983), the concepts of exploration and commitment have been applied to relational domains, such as friendship

and dating (Grotevant & Adams, 1984), and parents (Bosma, 1985). What is the meaning of having commitments with regard to relationships? Grotevant, Thornbecke, and Meyer (1982) proposed that committing oneself in an ideology of intimate relationships possibly precedes establishing such relationships. Bosma (1985) suggested that a "here-and-now" (p. 119) perspective on identity domains may be more important than future commitments for one's sense of identity. In agreement with this view, Grotevant (1987) and Meeus, Oosterwegel, and Vollebergh (2002) used the concept of commitment in relational domains to refer to commitments in relationships rather than in ideology of relationships. This difference, however, renders problematic the distinction between identity and intimacy, the next developmental task in Erikson's (1950) theory.

Intimacy refers to the capacity of the individual to form intimate relationships (Orlofsky, 1993). Stated differently, it has to do with the individual's position in close relationships (Erikson, 1950) rather than with the individual's statements on these close relationships. For example, the extent to which individuals self-disclose to their parents refers to their intimacy (see Clark & Reis, 1988), whereas the importance of parents in the individuals' lives refers to their commitments with regard to their relationships with their parents, that is, to their identity.

Evolution of Parent-Offspring Relationships

We chose to study the relational domain of parents because there is extensive literature on parent-offspring relationship changes. This relationship is altered in time because of changes in the experiences and capacities of both sides of the relationship (Collins, 1997), developmental changes in the family life (Barker, 1998), and changes in roles that the child undertakes outside the family (Dubas & Petersen, 1996). The nature of the parent-child relationship at earlier ages (Rossi & Rossi, 1990) and the position of the parents (Collins, 1997) are important factors as well.

As they start forming close relationships with peers, individuals become less dependent on their parents (Ainsworth, 1989). Autonomy, however, develops jointly with the maintenance of a close and affectionate relationship with parents (O'Connor, Allen, Bell, & Hauser, 1996). By late adolescence, the emotional distance and emerging cognitive capacities allow the re-evaluation of the relationship with parents (Allen & Land, 1999), which changes, eventually, from hierarchical to symmetrical (Barker, 1998).

From this short overview, it appears that many factors affect the formation of the relationship between individuals and their parents. Obviously, the individuals are important as well. However, it may be simplistic to assume that only one aspect of their behavior, collecting information and deliberately choosing among alternatives, defines their

commitments with respect to parents. In other words, it is likely that exploration does not apply as the only mechanism of commitment formation in respect to relationships with parents.

Theoretical model of this study

According to various process models of identity change (such as Grotevant, 1987; Kerpelman, Pittman, & Lamke, 1997), changes in commitments are initiated by perceived conflicts between identity standards and environmental input. Following Bosma and Kunnen (2001a), we assume that every context- individual transaction results in a match or a mismatch between commitments and context. Match confirms commitments, whereas action is triggered to reduce mismatch. According to Bosma and Kunnen, action can take the form of assimilation or accommodation. However, Grotevant (1987) warned against rational models describing the making of important decisions. Besides cognitively based models, emotions have been related to identity (Bosma & Kunnen, 2001b; Strayer, 2002).

Emotions

Emotions arise when objective situations, the so-called objects of emotions, are appraised (Frijda, 1993). Although initially thought of as disorganizing (Pervin, 1993), in modern theories, emotions have both positive and negative effects on behavior (Mellers, 2000), cognition (Frijda, 1993), and motivation (Isen, 1993). According to cognitive-constructivist theories, they convey information on the personal relevance of environmental stimuli (e.g., Mellers, 2000). Following a frequently cited taxonomy (e.g., Parkinson, 1995), emotions may be positive or negative. Both categories of emotions are related to stimuli that are of personal concern (Frijda, 1993), the most often cited being goal achievement (Pomerantz, Saxon, & Oishi, 2000). Because of the developmental significance of having made commitments (Erikson, 1968), it is expected that positive and negative emotions will be related to the confirmation and disconfirmation of commitments, respectively.

Emotions and commitments

Commitments refer to the equilibrium between internal standards and environmental data (Burke, 1991). As was previously stated, environmental data may match or mismatch identity commitments. Literature predicts that, when environmental data match internal standards, no change is likely (Kunnen & Bosma, 2000). We suggest that this is so only when positive emotions arise from the match. However, negative emotions may also arise. For example, when individuals meet people who are differently committed in respect to their parents, they may feel unsatisfied with their own

commitments. Then, matching environmental data shall yield negative emotions, and the content of the commitments shall be likely to change (compare the function of accommodation; Bosma & Kunnen, 2001a).

When positive emotions arise from environmental data that mismatch a commitment, it is likely that a new commitment will be formed to account for the subjectively favored mismatching experience. When emotions deriving from mismatch are negative, the individual is likely to retain the previously held commitment and reduce the importance of the unfitting data (compare the function of assimilation; Bosma & Kunnen, 2001a).

Stated differently, our model predicts that, if the object of positive emotions matches a commitment or the object of negative emotions mismatches a commitment, this commitment is unlikely to change. If the object of negative emotions matches a commitment or the object of positive emotions mismatches a commitment, then this commitment is likely to change. For example, take the commitment "My parents are the most important persons in my life," and the environmental data "My parents called me today" (matching, because it shows that they are present in my life) and "My parents are absent" (mismatching, because it shows that they are not part of my life). If the matching datum causes joy, the commitment will possibly be retained. If it causes sadness, the commitment will possibly change. Similarly, if the mismatching datum causes sadness, the commitment will possibly be retained. If the mismatching datum causes joy, the commitment will possibly change.

Emotions and exploration: Friends or rivals?

Literature has for a long time relied on exploration to explain identity changes. Here, a model based on emotions is presented. These two notions are not incompatible. Different emotions are assumed to signify the onset, process, and end of exploration. Thus, negative emotions, such as subjective discomfort (Waterman, 1982), can trigger the exploration process. Once activated, this shall involve feelings such as anxiety, satisfaction, and challenge according to the perceived success or failure of the exploratory behaviors (Grotevant, 1987). Relief and excitement shall accompany identity changes (Stein, Trabasso, & Liwag, 1993). In short, the concepts of exploration and emotions may well work hand-in-hand in explaining identity changes.

Furthermore, introducing emotions in the identity change process does not deny the role of cognitive processes, which are important in the exploration concept. Emotions arise as a result of the appraisal of environmental stimuli (Frijda, 1993). The quality of emotions (negative or positive) depends on the relevance of their objects to the personal concern of the individual (Frijda, 1993). In other words, assuming that emotions play an important role in identity formation does not mean that cognitive factors are

not important, because the latter are inextricably related to emotions. What is added to the exploration model is that other aspects of the individual- context interaction are taken into account, in addition to the active quest of information (i.e., exploration).

Studying Identity Changes: In What Context?

The literature has identified relational, communal, and cultural variables (for instance, Baumeister & Muraven, 1996), as well as environments exposing the individual to alternative points of view (Grotevant, 1987) or to new contexts (Kroger & Green, 1996), as factors related to changes in commitments. Based on this, we chose to study individuals when they participate in an international exchange program. The European Union runs such a program, the Socrates/Erasmus, in order to encourage students to live and study abroad. Participating in this program entails temporarily living in a different culture, usually far away from parents (for implications of living away from parents, see Dubas & Petersen, 1996), and exposure to alternative ways of relating with them (for examples of country differences in parent-offspring relationships, see Scabini, 1998).

Hypotheses

The following hypotheses were tested, as regards relationships with parents:

1. Exploration predicts whether or not commitment will change.
2. Emotions predict whether or not commitment will change.

METHOD

Overview of Methodological Design

We followed the participants for five months, while they participated in the Socrates/Erasmus program. During this period, they were filling in daily diaries on identity relevant experience. Before and after their stay abroad, we took descriptions of the content and measurements of the strength of their commitments.

Sample

Four Hellene female psychology students were studied. During her participation in this study, V., 20, was in her third year of studies. Her parents were high school graduates. Her father was working while her mother was a homemaker. Before her stay abroad, she was living with one of her three siblings in a flat underneath the flat of her parents and other two siblings. E., 21, was in her fourth year of studies. Her parents were high school graduates. Her father was working, and her mother was retired. For 3 years before the study, E. lived alone. T., 21, was in her fourth year of studies when she

participated in this study. Her parents were working university graduates. Before her stay abroad, she was living with her parents and siblings. Finally, during her participation in this study, A., 21, was in her third year of studies. Both her parents were working University graduates. Before her stay abroad, she was living with her parents and siblings.

Measures

Content and strength of commitments

The only instrument that measures both content and strength of commitment is the Groningen Identity Development Scale (GIDS; Bosma, 1985). The GIDS yields descriptions of the content, and scores in the strength of commitment and in the amount of exploration (18 and 14 items, respectively, answered on a 0 to 2 scale), in six identity domains: philosophy of life, occupation-university- leisure, personal characteristics, friends, intimate partner, and parents. The GIDS procedure was modified when readministered to focus on the period between the first and second measurements. Psychometric properties of the original version of the instrument are satisfactory (Bosma, 1985). At the end of the part of the project presented here, two commitments per participant per identity domain were available, together with the respective scores on strength of commitment and amount of exploration. Given the hypotheses of this study, only the content and strength of commitments in the identity domain "parents" were further analyzed. The scores in the amount of exploration only give an estimation of the degree to which individuals explore, but no information on day-to-day behavior that is the focus in this study.

Identity-related experience

A diary and an instruction booklet were used. The diary booklet included two diary sheets for each day abroad. More sheets were provided on request. In every sheet, the participants filled in the date of inscription, described the identity- relevant experience, and reported related emotions, accompanied by a number describing the intensity of the emotions (weak, intermediate, or strong). For examples of diary entries, see Appendix 1. We instructed the participants to complete one diary sheet per experience. Experience was defined as "facts that you meet or on which you are informed by others, actions by yourself or by others, thoughts by yourself or by others, discussions in which you participate or which you attend, etc." We asked them to report any experience that was related, in their view, to the domains discussed in the GIDS, and any other experience that they considered important. Lacking any research on the use of emotional terms in the Hellenic language, the participants were free to use whatever terms they

wanted. A suggestive list (see Appendix 2) rooting from English literature and Hellenic dictionaries was attached to the diary booklet.

Procedure

We administered the GIDS in the last two weeks before the participants left for abroad. After the interview, we gave them the diary and instructions booklet, and asked them to familiarize themselves with the procedure by filling in some diary sheets before their departures. They could then discuss about problems that may have appeared. During their stay abroad (about five months), they were filling in their diaries on a daily basis. At regular intervals, they were sending them to the main researcher. All participants went back to Hellas[3] for a two-week vacation in the middle of the term. Three of them continued completing their diaries during that period. Within a maximum of two weeks after their final return to Hellas, we administered the variation of the GIDS.

Analyses

Testing the hypotheses

In order to test our hypotheses, we assumed that individuals are committed at all times. The measurements taken before (T1) and after (T2) their stay abroad provide precise information on the characteristics of these commitments. Our two hypotheses assume that exploration and emotion entries provide enough hints to predict the T2 based on the T1 measurement.

Assume that individuals hold both T1 and T2 commitments during their participation in the study. At any time point, they report the strongest. The weakest acts as an alternative commitment. Based on this assumption, testing our two hypotheses can be reformulated as follows: If no change in content occurs, exploration behaviors and emotions shall explain how the T1 commitment remained stronger than the alternative commitment. Possible changes in the strength of this commitment shall also be explained. If content changes, exploration and emotions are assumed to explain why the T1 commitment becomes less strong than the alternative.

At T1, the content of the alternative commitment is by definition different from that of the reported commitment. Its exact content, however, can be determined only a posteriori and as long as a change in the content of the commitment occurs. By definition, as well, the alternative commitment is weaker than the reported (at T1) commitment. If the T1 commitment implied a theoretically immature relationship with parents, it is more probable that an alternative commitment will be stronger at T2; therefore, the strength of the alternative commitment is closer to that of the T1 commitment.

Applying this concept of alternative commitments, environmental data that mismatch the T1 commitment shall match an alternative commitment, and vice versa. Moreover, positive and negative emotions shall confirm and disconfirm, respectively, the commitment that agrees with their eliciting object. If a commitment is confirmed, its strength will increase, or the strength of an alternative commitment will decrease. Similarly, the disconfirmation of a commitment shall be manifested as a decrease in its strength or an increase in the strength of an alternative commitment.

Comparisons of scores in strength of commitment

The null hypothesis is that the difference between the T1 and T2 scores in strength of commitment is zero; the T1 and T2 scores come from the same underlying distribution. Using parametric statistics to test this hypothesis requires drawing conclusions about the distribution of all possible scores obtained by each individual (Welch, Huffman, & Lawrenz, 1998). Drawing such conclusions from two measurements is unsafe. Alternatively, resampling techniques can be used (Castro, 2002; Hayes, 2000).

As we mentioned before, the null hypothesis is that the difference between the T1 and T2 scores in strength of commitment is zero; stated differently, that the T1 and T2 scores come from the same underlying distribution. We will explain the technique we used to test this hypothesis by means of an example. Assume that individual X scores 30 and 36 in the strength of commitment at T1 and T2, respectively. These scores are the sums of X's answers to the 18 items on strength of commitment (see Measures). We first calculated the absolute observed difference between the T1 and T2 scores ($|30-36|=6$). If our null hypothesis is correct, it does not make any difference which answers were given in which time point; the difference between the sums at the two time points should be approximately the same.

To test this, we re arranged the answers to the 18 items in the two time points, and calculated the absolute difference between the respective sums. The first two columns of Table 1 show the observed answers to the strength of commitment items at T1 and T2 for the imaginary individual X. Note that the sums for T1 and T2 are 30 and 36 respectively. The third and fourth, and fifth and sixth columns of this table show two random re arrangements. The possible number of rearrangements is 18! that is far beyond the capabilities of usual computers. Using the function SHUFFLE from the PopTools[3] in Excel for Windows, we calculated the differences for 50,000 rearrangements. We derived the *p* value for our null hypothesis by dividing by 50,000 the number of times that a difference equal to or higher than the observed one occurred. In our example, such a difference occurred 2,261 times, and the *p* value is

[3] See http://www.cse.csiro.au/poptools

(2,261 / 50,000=).045 (for an introduction on such techniques, Good, 1994).

Table 1. Examples of re arranged answers to the 18 items on strength of commitment of our imaginary example.

	Observed data		Rearrangement #1		Rearrangement #2	
Item	T1	T2	T1	T2	T1	T2
1	2	2	2	2	2	2
2	2	2	2	2	2	1
3	2	1	2	2	2	2
4	2	2	2	2	2	2
5	2	0	2	2	2	2
6	2	2	2	2	2	2
7	2	2	2	2	0	2
8	2	2	2	2	2	2
9	2	2	2	2	2	2
10	2	2	2	2	2	2
11	2	2	0	2	2	2
12	2	1	1	2	2	1
13	2	2	2	2	2	2
14	2	1	2	2	2	2
15	2	2	2	1	1	2
16	2	1	1	2	1	2
17	2	2	1	2	2	2
18	2	2	2	2	2	2
Sum	36	30	31	35	32	34
|T1-T2|	6		4		2	

Comparisons of contents of commitment

For every participant, the contents of the T1 and T2 commitments were compared. The two commitments were considered as different if any element referring to the relationship between the participant and her parents has been changed, added, or eliminated, if the participant used words denoting subjective change (for instance, “ameliorated”), or when the two commitments were logically incompatible. In all other cases, the two commitments were supposed equivalent. A 100% agreement between two independent raters was achieved.

Coding of diary entries

The diary entries provided data on experience related to all domains included in the GIDS. From these, we chose the entries in which the participants used any of the words “mother,” “father,” “parents,” “family,” or “relatives,” or a personal pronoun that clearly referred to any of these. This criterion yielded a

number of 81 parent-related entries. Only these entries were further processed. In order to test the first hypothesis, we sought entries that described exploration behaviors, as appearing in Balistreri, Busch-Rossnagel, and Geisinger (1995), Bosma (1985), and Meeus, Oosterwegel, and Vollebergh (2002). The full list of these behaviors appears in Appendix 3. Agreement between two raters was 98%. In cases of disagreement, the entry was coded as not describing exploration (see Appendix 1 for examples of coding for exploration). Seven entries described exploration.

In order to test the second hypothesis, we sought parent-related emotions. In the 81 parent-related entries, 210 emotional terms were used. Further, in 18 of these entries, emotions were described in the main body of the entry. All these emotions were first categorized according to their object. The main researcher concluded that emotions referred to being away from parents (54 occurrences), being with them (23 occurrences), doing things with them (16 occurrences), the parents themselves (14 occurrences), and experiences in which the parents are not of main focus (24 occurrences; for examples of coding on emotion occurrences, see Appendix 1). A last category included emotions that were not parent-relevant (90 occurrences). The second author acted as a second rater in assigning parent-related emotions to these categories. The initial interrater agreement was 84%. Following discussion between the raters, the agreement was 97%. When no agreement was achieved, emotions were kept out of further analyses.

Coding on emotions was conducted independently of the content of T1 and T2 commitments. At the next step, for every participant, we judged whether the object of each emotion matched the T1 commitment. The effect of positive and negative emotions (see Appendix 2) on the T1 commitment and on some alternative commitment was determined according to the formulation presented above. All commitments could be roughly summarized in the extent to which the participants were satisfied from their relationships with their parents, expressed in terms of importance or of satisfaction. If the T1 commitment exhibited that the relationship was satisfactory, being with and doing things with parents matched this commitment, while being away from them mismatched it. Positive emotions towards parents matched this commitment, as well. Reversely, if the T1 commitment exhibited that the participant was not satisfied with her relationship with her parents, being with and doing things with parents, as well as positive emotions towards her parents, mismatched the T1 commitment. Being away from them matched it.

RESULTS

Due to the small sample size, we did not calculate *z* values for the scores in strength of commitment. Although we used the raw, arithmetic data to

proceed with the comparisons, here we only report the strength category in which the scores fell: very low, rather low, moderate, rather high, and very high (for the use of absolute scores, Hofstee & Hendriks, 1998). An overview of the occurrences of exploration and emotion entries appears in Table 2.

Data on V.

At both T1 and T2, V.'s commitment referred to the faultlessness of her relationship with her parents (very high strength of commitment; p=.60).

Testing the hypotheses

1. Exploration predicts whether or not commitment will change

No entry referred to exploration. Thus, the data on V. do not support the first hypothesis.

2. Emotions predict whether or not commitment will change

Fifteen parent-relevant emotions appeared in V.'s diaries. Three of them referred to being away from parents, five to being with them, five to doing things with them, and two to the parents themselves. V. consistently reported negative emotions (such as worry) for being away from parents and positive emotions (such as joy) for being with or doing things with them. The former emotions disconfirm any alternative commitment, while the latter confirm the T1 commitment. Furthermore, V. reported love towards her parents twice. As expected, neither the content nor the (already very high) strength of V.'s commitment changed. The only possible effect of the aforementioned positive and negative emotions is the decrease of the strength of some alternative commitment, which, though cannot be tested. In conclusion, the data on V. support the second hypothesis.

Data on E.

At both T1 and T2, E.'s commitment referred to a satisfactory relationship of support and respect for each other's choices (very high strength of commitment; p=.74).

Testing the hypotheses

1. Exploration predicts whether or not commitment will change

No entry referred to exploration. Thus, the data on E. do not support the first hypothesis.

2. Emotions predict whether or not commitment will change

Forty-four parent-relevant emotions appeared in E.'s diaries. Nineteen of them referred to being away from parents, eleven to being with them, ten to

Table 2. Overview of number of diary entries referring to exploration, and of emotional terms used by V., E.

Participant	V.	E.	T.	
Exploration entries	0	0	3	
Parent-relevant emotions	15	44	12	

Emotions referring to:	Positive	Negative	Positive	Negative	Positive	Negative	Positive
Being away from parents	0	3	3	16	0	6	2
Being with parents	5	0	11	0	1	0	3
Doing things with parents	5	0	10	0	0	0	1
Parents	2	0	4	0	1	4	2

doing things with them, and four to the parents themselves. Sixteen (84.2%) out of the 19 emotions referring to being away from parents were negative (worry, sadness, nostalgia). The remaining three (15.8%) referred to her ability of managing to live alone (hope, zest, trust), rather to being away from the parents. E. consistently reported positive emotions (such as joy, content) for being with or doing things with her parents. In four instances, she expressed interest and affection towards her parents. The negative emotions referring to being away from her parents disconfirm alternative commitments, while the positive emotions referring to being or doing things with them and to the parents themselves confirm the T1 commitment.

As expected, no change in the content of commitment occurred. In addition, no increase in the strength of commitment is expected, because this was already very high. Indeed, no change occurred. As was the case in V., the only possible effect of the reported positive and negative emotions is the weakening of some alternative commitment. However, since no direct measurement of any alternative commitment is available, this effect cannot be tested. In conclusion, the data on E. support the second hypothesis.

Data on T.

At T1, T.'s commitment referred to a rather bad relationship with her parents, but a rather positive disposition toward her mother because of her successful attempt to raise her daughters. At T2, T. reported that her relationship with her parents "has become more substantial," that their communication ameliorated, and that she feels emotionally closer to them. The strength of commitment significantly (p=.014) increased from rather high to very high.

Testing the hypotheses

1. Exploration predicts whether or not commitment will change

Three entries referred to exploration: "We were discussing … the news of [my] family. I am speculating my mother's behavior;" "My mother takes some things very seriously;" and "As December approaches, I think more of my family…. [A friend] is talking very nostalgically for … her family." The first and second entries contradict her commitment at T1, when she was disposed very positively toward her mother. The friend, who talks nostalgically of her parents, is a person who holds a similar commitment. While these exploration entries predict that a change in the commitment is likely, none of them predicts the direction of the change that actually occurred. Thus, the data on T. do not support the first hypothesis.

2. Emotions predict whether or not commitment will change

Twelve parent-relevant emotions appeared in T.'s diaries. Six emotions referred to being away from parents, one to being with them, and five to the

parents themselves. T. constantly reported negative emotions (such as sadness, worry) for being away from her parents. Unlike the previous cases, T. did not report a good relationship with her parents at T1. Therefore, the object of her negative emotions (being away) agrees with her T1 commitment, and the negative emotions themselves disconfirm this commitment. T. also reported negative emotions (such as annoyance) toward her mother, who was favored at T1. These emotions as well disconfirm the T1 commitment.

There are only two positive emotions; these include love towards the parents and joy for being with her father. These are the only emotions that support an alternative commitment; that of a good relationship with T.'s parents. The emotions reported by T. suggest that there can well be a change in the content of her commitment, because her initial commitment continually loses ground, while an alternative one seems to be more favored now. Indeed, the content of T.'s commitment changed. Moreover, the strength of the commitment changed in the expected direction: It increased. A decrease in the strength of the T1 commitment (that is an alternative commitment at T2) is also predicted by these emotions, but no data are available in this respect. In sum, the data on T. support the second hypothesis.

Data on A.

At T1, A.'s commitment referred to her parents being the most important persons in her life and to the benefits she gains from their relationship. At T2, she eliminated the element "the most important" and added the hope that they will become less overprotective. The two commitments were judged as different. The strength of commitment significantly ($p=.02$) decreased from very high to rather high.

Testing the hypotheses

1. Exploration predicts whether or not commitment will change

Four diary entries referred to exploration: "I wonder whether it is worth somebody leaving his family and putting it in so many expenses;" "In such a society, parents who would like to raise their children with principles … have to face many problems … in the upbringing of these [youngsters];" "[H]e told me that he speaks with his parents on the phone once per week. … I speak with them every day;" and "[Upon return home,] I will have to keep up with the pace of the family." None of these entries refer to parents being the most important persons in her life, to the benefits A. gains from their relationship, or to their being less overprotective. That is, the exploration that occurred does not predict the observed changes. Thus, the data on A. do not support the first hypothesis.

2. Emotions predict whether or not commitment will change

Twenty-eight parent-relevant emotions appeared in A.'s diaries. Nineteen of them referred to being away from her parents, four to being with them, one to doing things with them, and four to the parents themselves. Unlike all previous cases, A. did not constantly favor one commitment over another. Seventeen of the emotions referring to being away from her parents are negative (such as worry, upset, nostalgia). The remaining two emotions are positive (content, satisfaction): they refer to enjoying life abroad (as opposed to going back home), and to cooking in the absence of the mother. On the other hand, although she mainly reported positive emotions (such as joy) for being with or doing things with her parents, in one case she reported missing life away from them. In one entry, she reported love and, in another, irritation towards her mother. Finally, in one entry, she reported sadness and worry for being uncared for by her mother.

A peculiarity in the content of A.'s commitment is that there is a change (unlike V. and E.), but not a radical one (like T.). The element of her parents being important persons in her life exists in both commitments. Thus, both commitments are supported by the negative emotions that confirm that her parents are important and by the negative emotions that disconfirm the alternative that they are not. In terms of change, then, these emotions can be overlooked. The two entries reporting positive emotions for being away from her parents confirm the T2 commitment, that they are not the most important persons in her life. Furthermore, the sadness and irritation reported towards her mother confirm the view that her parents have drawbacks that A. would like eliminated. In short, the emotion entries successfully predict the change in the content of commitment. However, the observed decrease in the strength of commitment cannot be accounted for by these data. In sum, the data on A. partly support the second hypothesis.

CONCLUSION- DISCUSSION

The identity status literature has for long relied on exploration as the main mechanism underlying changes in commitments. This study suggests that exploration behaviors do not predict commitment changes, at least in the relational domain of parents. On the other hand, emotions, largely neglected in identity literature, seem to provide more information regarding changes in commitments.

As we already described in the introduction, various researchers have defined exploration in varying ways. A common theme in these definitions refers to the active role of individuals in gathering information and making decisions. In this study, we operationalized exploration according to behaviors appearing in relevant means of measurement (namely, in Balistreri, et al., 1995; Bosma, 1985; Meeus, Oosterwegel, et al., 2002). The link between

these behaviors and the active search of information and decision making is not always clear. If a more theoretically driven operationalization were used, even less exploration behaviors would have been detected. So doing, the conclusion would still be the same: Exploration does not predict changes in commitment.

The assumption lies in literature that emotions can communicate information about the personal relevance of experience (Mellers, 2000). Based on this, our second hypothesis suggested that emotions predict whether or not commitment will change. Data on three of the four cases presented here supported this hypothesis: Emotions successfully predicted the stability in the content and strength of E.'s and V.'s commitments, and the change in the content and the increase in the strength of T.'s commitment. In one case, that of A., emotions successfully predicted the change in the content of commitment, but not the observed decrease in its strength.

Why may this be the case? Factor analyzing his data collected with GIDS, Bosma (1985) concluded that the items on strength of commitment load on two factors: the degree to which individuals identify with their commitments and the degree to which these commitments provide direction for the future. In the case of A., the identification score remained very high ($p=1.00$); therefore, the observed decrease in the strength of commitment reflects the decrease in the score in direction for the future only. This score is only indirectly related to the initial theoretical definition on which we based our theoretical model. The identification score, on the other hand, which is more directly related to this model, remains high, as one would predict, based on the emotion occurrences.

We chose to study the link between everyday experience and commitments in relation to parents because there is abundant literature on the relationship between parents and their growing children, and because of the diversity of the commitment trajectories of our four participants (changes as well as stability in strength and in content of commitment). These arguments may appear problematic. Although relationship with parents is a relational identity domain appearing in literature (Bosma, 1985), it is in several ways different, for instance, from relationships with friends: People cannot choose their parents, and they are related to them even without having formed relevant commitments. Such differences between identity domains, though, led us to the conclusion that maybe exploration is not the only mechanism yielding identity changes.

Further, although the commitment trajectories were interesting, only a small fraction (81 out of 610; 13%) of the total number of diary entries referred to parents. Moreover, how can, for example, a single phone call change the view an individual has built on her parents throughout a span of 20 or more years? As we noted earlier, participants were asked to report experiences

related to any of the identity domains tapped in the GIDS. Although we hoped that participants would report all related experiences, it appeared that they eventually reported only the most prominent ones; for most days of their stay abroad, there was only one diary entry. Thus, we assumed that parent-related experiences were reported, when they subjectively had, at least some, impact on the participants.

This study was exploratory: It aimed at revealing some weaknesses of this theory and at supporting some alternative ideas. In this respect, the small sample size of this study is one of its strengths. Case studies have several advantages. Rosenberg (1989) suggested that "any general explanatory principle… must ultimately be shown to apply at the individual level" (p. 418). Also, Magai and Hunziker (1993) warned against the use of nomothetic studies when the focus is on dynamics of individual development. Kroger (1993) recommended case studies in areas without well-established theory, as is the link between commitments and emotions. On the other hand, although it is interesting to see that exploration does not apply as the main mechanism of commitment change, investigating the role of emotions in four cases cannot support building a new theory accordingly. To do so, it is essential to follow more individuals, in a longitudinal design, focusing on microprocesses, as we did here.

In designing this study, we took into account the convenience of the participants: They chose where to be interviewed, which experiences to report, which emotion terms to use, and how often to send the diary entries to the researchers. This had the expected results: No dropouts, high punctuality in filling in the diaries, will to participate in all phases of the project. A lack of appropriate instruments, and a concern in the content of the experience and of the commitments led us to use mainly open instruments. This was a suitable way to approach the questions raised in this study. On the other hand, objectively coding open diaries and comparing the content of commitments in order to reach safe conclusions may have led to losing important information. Devising easy-to-use instruments that yield easy-to-analyze data should precede replicating such a study.

Due to the exploratory nature of this study, we relied on rather simplistic ways to approach our data. We assumed that the order of experiences in terms of time is not important; that all kinds of experience have the same effect on the strength of commitment; and that parent-related experiences are independent of other identity- related experiences. These assumptions may not hold. It may be more influential to experience joy for doing something with one's parents after rather than before a long period of living away from them. When expressing content for things with the parents, part of the content may arise because of the activity itself. Therefore, content for being with one's parents may be more important than content for doing

things with them. Finally, experiences with friends or with an intimate partner may be related to experiences with parents.

As we suggested in the introduction, emotions and exploration may be related. Accordingly, the participants were instructed to report emotions related to experience that was later coded as exploration. However, the small number of exploration entries did not allow testing whether the theory-predicted series of exploration-related emotions actually hold. Instead, our analyses showed that emotions alone are more informative than exploration in terms of explaining changes and stability in commitment with respect to parents. It would be interesting to see whether the same holds for other kinds of relationships, such as friendships or intimate relationships, and for nonrelational identity domains. Finally, it would be interesting to define in more detail the effect of emotions on commitment, by building, for example, a mathematical model to predict changes in content and strength of commitment.

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APPENDICES

1. Examples of Diary Entries and Related Codes

Exploration coding

Code	Diary entry
Presence of exploration	"I was talking to a German student, and he told me that he speaks with his parents on the phone once per week. And when he heard that I speak everyday with them, he was surprised! Is it possible to talk so sparsely to your parents?"
Absence of exploration	"We went with my parents [on an excursion]. They liked it a lot and we had a good time."
Disagreement between raters	"We all three agreed that we miss our families"

Emotion coding

Code	Diary entry
Being away from (any of) the parents	"Today my mother left to Hellas. We were both touched. I do not mind I will be here; it is just that it will be long till I see her again. Commotion, worry"
Being with (any of) the parents	"Finally we flew! With a big delay, we arrived in [Hellas]!! There our parents were waiting for us. I was very pleased to see them because I had missed them much. Elation, relief, joy, zest"
Doing things with (any of) the parents	"Today we stayed in [the town of studies]. My parents had not seen it at all and we had the chance to do so today. They liked it much, although it does not have anything special and it is small. Calmness, joy, content"
The parents themselves	"In the evening, I felt lonely and I missed very much my relatives. I particularly missed the affection and company of my mother. Love"
Experience in which the parents are not the main focus	"My father announced to me that we reserved a new car (…). Enjoyment, surprise, zest, joy"

2. List of Emotional Terms Used in the Diary Entries

Positive emotions	Negative emotions	Unclassified emotions
Affection	Annoyance *	Apprehension *
Calmness	Anxiety *	Commotion
Content *	Disappointment *	Impatience
Elation *	Discouragement	Surprise
Enjoyment *	Doubt *	
Happiness	Fear *	
Hope *	Guilt *	
Interest *	Indifference *	
Joy *	Indignation *	
Love *	Irritation	
Pride *	Loneliness	
Relief	Nervousness *	
Satisfaction *	Nostalgia	
Trust *	Sadness *	
Zest *	Strain *	
	Upset *	
	Worry *	

Emotional terms marked with an asterisk appeared in the suggestive list of emotional terms attached to the diary booklet.

3. List of exploration behaviors

- Trying to learn more things on (parents)
- Trying to find out what others think on (parents)
- Speaking with others on (parents)
- Thinking about (parents)
- Having problems with (parents)
- Talking with others about (parents)
- Having problems with (parents)
- Talking with others about (parents)
- Noticing that others can have different commitments to (parents)
- Comparing one's commitment to that of others
- Having conflicts with others about (parents)
- Engaging in discussions about (parents)
- Thoughtfully considering different ways of commitment
- Trying to learn about different ways of committing oneself to find the most suitable for one
- Discussing with people who are committed in different ways

Chapter 4

Friends and Relationships with Parents: A Diary Study

ABSTRACT

We used a dynamic systems approach to study the assumption that building mature friendships triggers a process of transforming one's relationship with one's parents. We built a mathematical model aiming at simulating this process in time. To investigate the viability of this model, four individuals (20-22 years old) reported daily peer-related experiences for five months, while they participated in an international exchange program. In the beginning and end of this period, we took descriptions of their commitments concerning their relationships with their parents. The data collected provide overall support for our model.

This chapter is based on:
Vleioras, G., Van Geert, P. L. C., & Bosma, H. A. (submitted). Tell me about your friends and I will tell you… what you think about your parents: A neglected link between friends and parents.

INTRODUCTION

Relationships with parents and friends are important in the lives of adolescents (Kerr, Stattin, Biesecker, & Ferrer-Wreder, 2003). Typically, researchers assume that characteristics of the parents (Wright, 1999) or of the parent-offspring relationship (Ducharme, Doyle, & Markiewicz, 2002) affect the kinds of friendships that individuals develop. Sabatelli and Mazor (1985) were the first to suggest a supplementary link: That building friendships in adolescence provides individuals with the social support they need to change their relationships with their parents. Others have also expressed similar views but nobody has tested them. We will here suggest a process model for this supplementary link, and test it against empirical data.

Changes in the Parent-Offspring Relationship

The most cited framework on the parent-offspring relationship is the attachment theory (Bowlby, 1969; 1973). According to this theory, forming relationships with the so-called attachment figures is of paramount importance for the social and emotional development of children. Typically, mothers are the main attachment figures in the first months of life. Later in childhood, fathers assume a comparable position. During adolescence, other individuals enter the scene, and the attachment to parents grows weaker. Despite this attenuation, it remains important across the life span. The continuing importance of parents in the lives of children recurs in literature (e.g., Dwyer, 2000).

Although parents remain important, parent-offspring relationships go through several transformations (Collins, 1997). Preadolescents consider their parents omnipotent. As they grow older, they increasingly realize that parents have weaknesses (Orvin, 1995), and that they can make mistakes; parents also start accepting that adolescents can have their own views (Youniss & Smollar, 1989). Furthermore, adolescents spend decreasing time with their parents (Collins, 1997; Steinberg & Morris, 2001). Finally, the parent-child complementary, unilateral relationship transforms into a symmetrical (Knap, 1984), mutual (Graber & Brooks- Gunn, 1996), and egalitarian one (Steinberg & Morris, 2001). In conclusion, a mature parent-offspring relationship is mutual and egalitarian; an immature one lacks such characteristics.

Parents and Friends: A Supplementary Link

Researchers typically assume that characteristics of the parents or of the parent-offspring relationship affect friendships. There are two problems with this view. First, it is inappropriate to relate friendships with only static characteristics of the changing parent-offspring relationship. Second, research

supporting this link (for instance, Engels, Finkenauer, Meeus, & Dekovic, 2001) is equivocal because it is cross-sectional. A supplementary link appears in theoretical accounts only. The support, approval, and security provided by friends are essential for renegotiating one's relationship with their parents (Sabatelli & Mazor, 1985). It is in the context of mutual friendships that adolescents' individuality is expressed and accepted by others for the first time (Youniss & Smollar, 1985). Moreover, in mature friendships, adolescents learn social skills not learnt in the parent-offspring relationship (Zimmer-Gembeck, 2002). These skills are then applied in the parent-offspring relationship to allow for the adolescents' individuality to be expressed and accepted. Finally, establishing affect and inclusion patterns in peer relationships alters the interpersonal needs in the family relationships (Knap, 1984). In conclusion, it is theoretically plausible that friendships contribute to the maturation of the parent-offspring relationship.

Friendships are personal relationships built on a voluntary basis that typically provide intimacy and assistance to their members, who like each other and seek each other's company (Fehr, 1996). Building friendships entails several steps. First, contextual factors, such as physical proximity (Furnham, 1989), constrain with whom people can become friends. From the available individuals, people choose the most attractive ones (for a review, Perlman & Fehr, 1986). They then initiate a movement to establish a friendship, and the other person needs to reciprocate (Hallinan, 1978/79). Then, the friendship starts being built (Levinger, 1980), for example through less personal or intimate activities (Blieszner, 1989). At later stages, friendships can continue at a high level of exchange of personal information, switch to earlier stages of interaction, or dissolve (Berscheid & Reis, 1998; Blieszner, 1989).

From this overview of friendship building, it becomes clear that friendships should be treated like processes, rather than states (see also Duck & Sants, 1983). Here, we expect the building of mature friendships to trigger a process of transformation of the parent-offspring relationship. Meeting people that one finds attractive is a first step in starting questioning the preponderance of parents in one's life. Initiating a movement to establish a friendship means that the individual brings new emotional needs in the family. However, only relatively high levels of interaction allow one's relationship with parents to reach its mature form. In conclusion, a process rather than a static perspective is more likely to adequately grasp the link between the creation of friendships and the maturation of the parent-offspring relationship.

Experience through the Eyes of the Individual

In this study, we focus explicitly on the experiences of individuals from their perspective. Research on relationships with parents and friends usually rests

on questionnaires; findings are interpreted as if they exhibited objective reality, and as if this reality were what really mattered. This approach has some drawbacks. Answering questions on relationships with parents reflects the individuals' perceptions of these relationships (Engels, et al., 2001), rather than some objective relational quality. Similarly, answering questions on friends reflects expectations from and beliefs about friendships, but not information on actual interactions (Parker & Gottman, 1989). Further, the subjective perception of reality is at least equally (Bronfenbrenner, 1977), if not more psychologically consequential (Engels, et al., 2001) than objective reality. Here, we will focus on these subjective perceptions. This has more interpretational than methodological implications. In terms of method, we will still focus on the perceptions of individuals, as was previously done. In terms of interpretation, though, we will accept these as perceptions of the relationship, not assuming that they reflect some objective relational properties.

We will focus on perceptions of the parent-offspring relationships by looking at the commitments individuals hold towards their parents. Commitments initially described the beliefs or decisions of individuals towards ideological issues (Marcia, 1966); later, they were extended to relational domains as well (for instance, Grotevant & Adams, 1984). Bosma (1985) applied commitments to the issue of parents. Here, we assume that, in their commitments towards parents, individuals describe their perspective on their relationship with their parents. Commitments towards parents will be called mature or immature depending on whether the individuals ascribe mature (such as mutuality) or immature (such as parents as perfect) characteristics to their relationship with their parents. The more the individuals identify with their commitments and the more they derive direction for the future from them, the stronger these commitments are (Bosma, 1985; Marcia, 1966).

We will use the emotions arising from peer-related experiences to examine the position of peers in the lives of individuals. Emotions result from the subjective appraisal of objective situations (Frijda, 1993), and convey information on the personal relevance of these situations (Mellers, 2000). In particular, they signal changes in the probability of achieving personal goals (here, the creation of friendships), and initiate action aimed at increasing this probability (Oatley & Duncan, 1992). For instance, sadness signals a loss, stops an activity, and initiates the search of new plans. We will use a frequently cited distinction between positive and negative emotions (for instance, Parkinson, 1995). Positive and negative emotions arising from different kinds of peer-related experiences shall exhibit different positions of peers in the lives of individuals; for instance, enjoying meeting peers shows

that these are acquaintances, while expressing love and interest for them shows that they are friends.

Methodological Considerations

In the last two sections, we explained that we focus on the process relating the subjective experience with friends with the subjective perception of the parent-offspring relationship. Here, we discuss two methodological implications of our focus on processes and on subjective experience: The sample size, and the nature of data to be collected. Regarding the sample size, case studies are particularly useful when testing explanatory processes (Branner, 1992; Rosenberg, 1989), as well as in areas without well-established theory (Kroger, 1993). Although we know many things about relationships with parents, friendships, and the effect of parents on friendships, we know far less about the process through which friendships affect relationships with parents. Therefore, we decided to conduct case studies and to compensate for this small sample size by taking dense measurements. If case studies support a hypothesis, then it makes sense to design projects that follow more individuals. Qualitative data are particularly suited for small samples, and when the focus is on processes and on reality as constructed in the individuals' mind (Neuman, 2000; Pelham & Blanton, 2003). The use of diaries, in particular, allows inspecting the subjective experience of people on people, events, and settings that are not directly observable (Bodgan & Taylor, 1975).

Studying Changes in Relationships: In what Context?

Following Elder (1998), we sought a context in which relationship changes are likely. Golish (2000) identified leaving the parental home as a turning point in the parent-offspring relationship, which may lead to its amelioration or deterioration. Acquiring physical distance also entails changes in friendships: Moving away from home necessitates negotiating how much contact to keep with hometown friends (Johnson, Staton, & Jorgensen- Earp, 1995). The initial strength of the relationships determines which ones will hold and which will reach a natural end. While decreased direct contact with parents and friends is unequivocal (Weiss, 1990), the need for social provisions increases, since the physical distance induces several stressors (for examples, Fisher, 1990), making the search of new relationships more likely.

Participating in an international exchange program entails temporarily living away from home. The European Union has initiated the Socrates/ Erasmus program to encourage students to spend at least three months studying in another European country. The program assists the students financially and administratively, thus reducing the load of stressors.

Further, the temporary character of the program implies that the experience is less strong than the one entailed in permanent losses (see Weiss, 1990). For these reasons, we assumed that participating in the Socrates/Erasmus program is an appropriate context for studying changes in relationships. Since it is the daily peer-related experience that is important in our model, we need to focus on daily measurements of this experience to secure the validity of our study. Measuring peer-related experience on a daily basis is also economic in the context of the Socrates/Erasmus program because we expect changes to occur within a relatively short period.

Aims of the Present Study

Our major assumption is that building mature friendships triggers a process of transformation of the parent-offspring relationship. We can now further specify our aims as follows:

(a) Building a mathematical model describing the process linking the friends-related emotions and the maturity of commitments towards parents; and
(b) Empirically testing this model.

METHOD

Overview of Methodological Design

We followed the participants for five months, while they participated in the Socrates/Erasmus program. Before (T1) and after (T2) their stay abroad, we took measurements of their commitments towards parents. During their stay abroad, they were completing daily diaries on friends-related experience.

Sample

Four Hellene female psychology students participated in this study. None of them had a history of emotional or other psychological problems. T., 21, was in her fourth year of studies. Her parents were working university graduates. Before her stay abroad, she was living with her parents and two of her three siblings. A., 21, was in her third year of studies. Her parents were working university graduates. Before her stay abroad, she was living with her parents and two siblings. E., 21, was in her fourth year of studies. Her parents were high school graduates. Her father was working, while her mother was retired. Before her stay abroad, E. was living alone in a city 200 km away from her hometown, where her parents and sibling lived. Finally, V., 20, was in her third year of studies. Her parents were high school graduates. Her father was working, while her mother was a housewife. Before her stay abroad, she was living with one of her three siblings in a flat underneath the flat of her parents and other two siblings.

Measures

Commitments towards parents

The only measure of the content and strength of commitments is the Groningen Identity Development Scale (GIDS; Bosma, 1985), which taps on the issues of parents, friendship, personal characteristics, intimate relationships, future occupation- leisure- school, and philosophy of life. We will here refer only to the section on parents. We first interviewed the participants on their parents: In what respects are they important to you? What do you appreciate in them? What irritates you about them? We slightly changed these questions at T2 so that they refer to the period between T1 and T2 (for instance: What irritated you about them while abroad?). We concluded this interview with the question: How would you summarize your commitment towards parents? We will further refer to the qualitative answer to this question as the *content* of the commitment.

Finally, the participants answered a 32-item questionnaire. All items were answered on a 0-2 scale. Here, we will use the scales measuring the strength of commitment (18 items; e.g., "Are you satisfied with your commitment?") and the active attempt to reach a new commitment (7 items; e.g., "Do you try to develop a new commitment for this issue?"). Both scales have acceptable alpha coefficients in the original version of the GIDS (.84 and .80, respectively). All scores were divided by the maximum of the scale to yield a score ranging from 0 to 1.

Friends-related emotions

We found no diary protocol concerning friends-related emotions. We devised a booklet including two diary sheets per intended day abroad. More sheets were available upon request. Diary sheets included spaces to complete the dates of inscription and of described experience, the friends-related experience, and the related emotions (e.g., joy, satisfaction). We instructed the participants to complete their diaries daily, and to use a separate diary sheet for every experience reported. If no noticeable experience occurred, they should give a brief outline of the day.

We defined experience as "events that you meet or on which you are informed by others, actions by yourself or by others, thoughts by yourself or by others, discussions in which you participate or which you attend, etc." We asked them to report experiences related, in their view, to the domains discussed in the GIDS, and all other experiences that they considered important. For the needs of this study, we further processed only entries referring to peers. Lacking any research on emotional terms in the Hellenic3 language, the participants were free to use whatever terms they wanted. A

suggestive list rooting from English literature and Hellenic dictionaries was provided.

Procedure

We administered the GIDS in the last two weeks before the participants left for abroad (T1). Then, we gave them the diary and an instruction booklet and asked them to familiarize themselves with the procedure by completing some diary sheets before their departures. They could then discuss about problems that may have appeared. While abroad (about five months), they were completing their daily diaries. At regular intervals, they were sending these to the first author. All participants went back to Hellas[4] for a two-week vacation in the middle of the term. Three of them continued completing their diaries during that period. Within maximum two weeks after their final return to Hellas (T2), we administered the parallel version of GIDS.

Analyses

In the introduction, we stated that the aim of this study is the mathematical description and the empirical test of a model of the process linking the peer-related emotions with the course of the commitments towards parents. Stated differently, we seek to describe and test a process based on peer-related experience that takes the T1 commitment as its input and gives the T2 commitment as its output. We will here summarize a parsimonious way of describing the course of commitments; we will describe the coding scheme of the peer-related diary entries; and we will outline how we empirically tested our model.

Parsimonious description of the course of commitments

In our previous work (Vleioras, 2003; Vleioras & Bosma, 2005), we introduced a way of describing the course of the strength and content of commitments. We suggested that at all times individuals hold two commitments: the one they report and some alternative commitment. The content and strength of the reported commitment are the ones given out, for instance, in GIDS. For example, an individual may report the commitment “My parents are the most important persons in my life” and this commitment may be very strong.

The content of the alternative commitment is by definition different from that of the reported one. In our example, the most generic alternative commitment would be “My parents are not the most important persons in my life.” This means that “My parents are still important, but my partner is more important” or that “My parents are not important at all.” We can specify the exact content of this alternative commitment only if a different commitment is reported at some second measurement. Then, we can assume that the specific

content of the alternative commitment during the first measurement was the one reported at the second measurement. The strength of the alternative commitment is by definition lower than that of the reported one. A change in the content of commitment occurs if the alternative becomes stronger than the reported commitment. This conceptualization facilitates the explanation of processes of commitment trajectories: Instead of explaining the course of the strength and of the content of a commitment, we now need to explain only the course of the strength of commitments.

Coding of diary entries

The diary entries provided data on experience related to all domains discussed in the GIDS. From these, we further processed only entries referring to peers. By peers, we mean "individuals who are similar to the [individual] in age and / or development level" (Ladd, 1989, p. 5). We studied peers in general, rather than friends only, because we were interested in both existing and prospective friends. We considered as peers individuals that were explicitly called friends or that were of similar status (students, exchange students, and age mates), excluding intimate partners. We also included entries referring to a family with which T. reported very good communication, despite the age difference. If any of the persons mentioned in an entry was a peer, we considered this a peer-related entry.

We first created an exhaustive coding scheme of the peer-related entries. We distinguished emotions as related to the following categories of peer-related experience:

(1) Positive emotions for first encounters with people: "The Erasmus coordinator wined and dined us: Other girls that have come from other countries through Erasmus were also there... Thus, we had the chance to meet them. Zest"

(2) Positive emotions for doing things with others: "In the evening, I went out with a girl with whom we hang around here, and went to a Brazilian party. Content, enjoyment"

(3) Positive emotions for getting to know the others better: "Today, I was sleeping the whole day. In the evening, I went to [student house]. We were discussing with L. and M. They are very nice. It was relaxing and fine. Content"

(4) Positive emotions for the presence of specific peers: "These days, I and A. spend most of the time together... I am very happy that she is here. Elation, trust, joy"

(5) Negative emotions for the absence of specific peers: "Today in the evening, we met the Romanian girl. Communication was a bit difficult. However, we managed! We all three agreed that we miss our families and friends. Sadness, worry"

(6) Affection towards peers: "Without anything special having occurred, I got up in a bad mood. Rather nostalgic. I missed much my relatives and friends in Hellas. Sadness, worry, interest, affection"

(7) Positive emotions for reflecting on the course of the relationship with peers: "I like this companionship and friendship I have developed with the guys. Each is busy with their distinct schedule, but we often eat together, spend quite some hours together. I did not have the chance to live such experiences in Athens. Content"

(8) Positive emotions for characteristics or behaviors of peers: "We went to the supermarket with two [natives]. They are very nice and pleasant. They also helped me register in the student house, showed me around, and gave me some useful information. Joy"

(9) Negative emotions for characteristics or behaviors of peers: "A girl with whom we have hanged around for two months left from [place] forever without saying goodbye to us, not even letting us know. Surprise, anger, indifference"

(10) Positive emotions for contacting friends: "I wrote a big letter to my friend E., in Athens. Unfortunately, I cannot describe to her in a single letter all I see here. Content, zest"

(11) Emotions related to studying: "We officially started our paper... Fortunately, we have time but it is difficult. However, I believe that we will make it. Strain, curiosity, hope"

(12) Emotions appearing in peer-related entries, but not related in any way to peer-related experiences, as described in categories 1-11: "In the evening, we saw the movie 'Life is beautiful' by Benini. [I can accept] that the Jews suffered much. However, they will never cease the propaganda for that period. Annoyance"

Empirical test of the model

We first needed to know the content and strength of the reported and alternative commitments at T1. The content and strength of the reported commitment is the one derived through the GIDS. Based on this content, we judged whether this commitment was immature or mature. If a commitment did not reflect any of the qualities related to maturity, we looked into the interview material and derived these qualities from there. We stated before that, by definition, the content of the alternative is different than the content of the reported commitment. Therefore, if the content of the reported commitment was immature, the content of the alternative commitment was mature, and vice versa.

The strength of the alternative commitment was by definition lower than that of the reported one, but could only be approximated. We already mentioned a scale that measures the active attempt of the individual to reach

a new commitment. We assumed that the higher the score on this scale, the more the individual is aware of the existence of an alternative commitment, and the higher the strength of this commitment. If the score on this scale is zero, the individual is not aware of the existence of any alternative commitment, and the strength of this commitment is zero. Assuming that A and C are the strengths of the alternative and reported commitments, that Ch is the score in the active attempt of the individual to reach a new commitment, and that all three scores are expressed on a 0 to 1 scale, then:

$$A = C * Ch \qquad (1)$$

The model to be constructed shall take these strengths and contents of the reported and alternative commitments at T1 as input and lead to some strengths and contents of these commitments as output on the basis of the reported peer-related emotions. Empirically testing this model shall entail testing whether our model successfully predicts the strengths and contents of the reported and alternative commitments at T2. This task can be broken into two components: Strength (do the strengths of the predicted reported and alternative commitments equal those of the empirically derived ones?) and content (do the predicted and empirically derived alternative and reported commitments agree with each other in terms of maturity?).

Regarding the first component, our null hypothesis is that the difference between an empirically derived and a predicted score on the strength of commitment is zero. Resampling techniques are advisable here (Castro, 2002; Hayes, 2000), because of the small number of measurements. There is one important difference between the strengths of the current and of the alternative commitments. In the case of the current commitment, we have not only the score in the strength, but also the scores of each individual in the 18 items on the strength of commitment (see Measures). In the case of the alternative commitment, we only have the score in the strength of commitment (derived through equation (1)). Because of this difference, we used different techniques for these two kinds of commitments. Both techniques rely on the logic of regenerating an assumed distribution on the basis of the available measurements (for an overview of such techniques, Good, 1994).

In order to test for statistical significance the difference between a predicted and an observed score in the strength of the current commitment, we built an algorithm as follows: For every pair of measurements (say, .916 and 1), we calculated the absolute observed difference ($|.916-1|=.084$). Note that, by using an absolute difference, we conduct a two-tailed test. In order to conduct a one-tailed test, we would calculate the exact difference. If the null hypothesis is correct, the difference between the two scores is zero; stated differently, the two scores come from the same distribution. In order to create

a distribution that contains the observed score, we created combinations of the answers to the 18 items on strength of commitment (see Measures) choosing 18 answers with replacement. Table 1 shows examples of such combinations. Note that, unlike the technique used in Chapter 3, replacement is essential here so as not to always use the same set of 18 items time (in this case, the *p* value would always be 1.00). The number of possible combinations is 18^{18} and exceeds the capacities of personal computers. We used the function RESAMPLE from the PopTools in Excel for Windows to create a distribution of 50,000 such combinations (for examples of such combinations, Table 1). We then calculated the difference between each of these 50,000 scores and the predicted score. We derived the *p* value of our null hypothesis by dividing by 50,000 the number of times that a difference equal to or higher than the observed one occurred. In our example, such a difference occurred 30,035 times, and the *p* value is (30,035 / 50,000=).60.

Table 1. Examples of combinations with replacement

Item	Observed data	Combination 1	Combination 2	Combination 3
1	2	2	2	2
2	2	2	2	2
3	2	2	2	2
4	2	2	2	1
5	1	1	2	2
6	1	2	2	2
7	2	2	2	1
8	2	1	2	2
9	2	2	2	2
10	2	2	2	2
11	2	1	1	2
12	1	1	2	2
13	2	2	2	1
14	2	2	2	2
15	2	2	2	2
16	2	2	1	2
17	2	2	2	2
18	2	2	2	2
Sum	33	32	34	33

In order to test the statistical significance of the difference between a predicted and an observed score in the strength of the alternative commitment, we built an algorithm as follows: For every pair of measurements (say, .833 and 1), we calculated the absolute observed difference (|1-.833|=.167) and the expected value under the null hypothesis that these two values are not statistically different ((1+.833) / 2=.9165). Using

the random number generation function in Excel for Windows, we created a binomial distribution of random scores using the expected value (.9165) as the probability that the answer to an item of the strength of commitment scale is 1. If this answer is not 1, then it is 0. Note that because such items were answered on a 0 to 2 scale, we re created the scores in 36 instead of 18 items.

We then used the Monte Carlo simulation tool[5] to create a distribution of 50,000 random differences between two scores coming from this distribution. The *p* value for our null hypothesis was derived by dividing by 50,000 the number of times that a difference equal to or higher than the observed one (.167) occurred (in our example, this difference occurred 456 times, and the *p* value is 456/50,000=.009). Note that this technique gives comparable results to the one testing the significance of the difference between the observed and predicted strengths of the current commitment, as well as to the technique used in Chapter 3.

Regarding the second component, the maturity of the empirically derived reported and alternative commitments was judged following the criteria outlined above. If a participant reported a mature commitment at T1 and the model predicted that this remained stronger than the immature (alternative) commitment, then a mature commitment should be reported at T2. If the model predicted that the immature (alternative) commitment became stronger than the mature (reported) one, then an immature commitment should be reported at T2. Similarly, if a participant reported an immature commitment at T1, and the model predicted that this remained stronger than the mature (alternative) one, an immature commitment should be reported at T2. If the model predicted that the mature (alternative) commitment became stronger than the immature (reported) one, then a mature commitment should be reported at T2.

RESULTS

Building a mathematical model

Our mathematical model aims at describing the process linking the peer-related emotions and the maturity of the commitments towards parents. In the Introduction, we suggested that the level of interaction and the depth of friendships determine the maturity of the commitments towards parents. Such a theoretical description allows only for general statements about the process in hand (Kunnen & Bosma, 2000). Mathematically describing a process challenges the investigator to make explicit statements about the interdependence of the variables and the effects of time (Van Geert, 1994).

We found three characteristics of dynamic systems models particularly attractive in so doing (see Huckfeldt, Kohfeld, & Likens, 1982). First, time can be represented as a series of time steps (defined, for instance, as the occurrences of experiences), rather than as a continuous variable. Running

such a model entails calculating the values of the variables over all time steps (compare, describing a process), not only the final time point (as, for instance, in linear models). Second, using difference rather than differential equations allows describing relatively more patterns over time with relatively simpler models. Finally, using difference equations requires only moderate mathematical sophistication.

In this section, we will mathematically model the course of the strength of the reported and alternative commitments. First, consider the case in which a strong immature commitment towards parents is reported. We can then assume that the alternative commitment is mature and weaker. We will start with describing the course of the strength of this mature commitment. In the introduction, we suggested that different levels of interaction and different depths of relationships with friends allow the relationship with parents to reach different levels of maturity. Further, the strength of the mature commitment depends on the strength already attained (for instance, Kunnen & Bosma, 2000). The logistic growth equation (Van Geert, 1994) adequately describes this reasoning:

$$Cm_{t+1} = Cm_t + Cm_t * r * (K - Cm_t) / K \qquad (2)$$

This equation describes how a later growth level of the strength of the mature commitment (Cm_{t+1}) is caused by an earlier growth level (Cm_t), some growth rate (r), and a carrying capacity (K). The carrying capacity is a concept borrowed from ecology and refers to the whole of resources (here, the peer-related experience) that support and maintain the variable at issue (here, the strength of the mature commitment). The sum of resources corresponds to the maximal level that Cm can reach (see Van Geert, 1994).

Changes Δ in the strength of the immature commitment depend on the actual strengths of the immature and mature commitments:

$$\Delta Cim = f(Cim, Cm) \quad (3)$$

Two points are important in order to define function f:

a) The mature and immature commitments are incompatible with each other (my parents cannot be both the most important and not the most important persons in my life); therefore, changes in the strength of the mature lead to reverse changes in the strength of the immature commitment:

$$\Delta Cim = - Cim * \Delta Cm \quad (4)$$

b) A successful identity formation entails the preponderance of one commitment over alternatives (for instance, Marcia, 1966). When this commitment is reached, maintenance and validation behaviors are initiated (Meeus, Iedema, & Maassen, 2002). In terms of our conceptualization, this means that if a mature commitment is reported and strong, further

experiences verifying it will have the effect of decreasing the strength of alternative commitments by a certain magnitude d:

$$\Delta Cim = - d * Cim * Cm \qquad (5)$$

Note that no modifying parameter was included in equation (4), where a change is proportionate to a change. Because no change element is included in the right part of equation (5), parameter d is needed to modify the effect of Cm.

Equations (4) and (5) can easily be combined:

$$\Delta Cim = - Cim * (\Delta Cm + d * Cm) \qquad (6)$$

Equation (6) can take the form of a difference equation:

$$Cim_{t+1} = Cim_t + \Delta Cim = Cim_t - Cim_t * (Cm_{t+1} - Cm_t) - d * Cim_t * Cm_t \qquad (7)$$

Finally, we need to describe how peer-related experiences are related to equations (2) and (7). Our major assumption is that having friends is important for having a mature relationship with one's parents. In the Introduction, we specified that the level of interaction and the depth of the friendships are important for the maturity of the parent-offspring relationship. In terms of equation (2), this means that the peer-related experiences determine the resources necessary to achieve a strong mature commitment towards parents, and, therefore, correspond to the carrying capacity of the strength of the mature commitment towards parents (K in equation (2)).

Based on the theory presented in the Introduction, we further used experience categories 1-7 (Method- Coding of diary entries). Experience categories 8-12 do not yield information on the level of interaction or the depth of friendships. Assume that a person has no peer-related experiences: Then, the level that the strength of the mature commitment can reach is minimal. The deeper the friendships created the higher this level. We expect the peer-related experiences 1-7 to show increasing depth of the friendships and, therefore, increasing carrying capacity of the mature commitment towards parents. Experiences 1 to 3 refer to increasing levels of interaction with peers, while experiences 4 to 7 denote the importance of the relationship for the individual.

We will use the word "order" to describe the depth of the friendships as described in everyday experiences: The higher the order of an experience, the deeper the friendship described. Expressing positive emotions for first encounters with people (first-order experience) is a first step for creating friendships. Enjoying doing things with others (second-order experience) is a context of exploratory affective exchange. Getting to know each other through

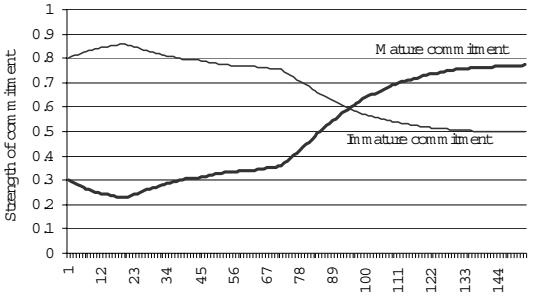
discussions (third-order experience) denotes a higher level of exchange of personal information. Positive emotions for the presence and negative emotions for the absence (fourth-order experience) of others are signs that their company is sought. Expressing affection (fifth-order experience) outside the context of a romantic relationship shows the importance of a person in one's life. Finally, explicitly calling somebody a friend and reflecting on one's relationship with him / her (sixth-order experience) is the ultimate sign that a friendship has been built.

The carrying capacity of the mature commitment is minimal in the absence of peer-related experience. When some peer-related experience occurs, the carrying capacity increases to some higher level depending on the order of this experience. The higher the level of this experience, the higher the carrying capacity. We have seen that friendships, once established, can continue at a higher level of interaction, switch to earlier stages of the interaction, or dissolve. Accordingly, the carrying capacity may increase, decrease, or remain stable, according to the next experiences. At every next step, if a higher-order experience occurs (higher level of interaction), the carrying capacity increases again to the level corresponding to this new experience. If a lower-order experience occurs (earlier stages of interaction, friendship dissolution), the carrying capacity will decrease; the lower the order of the new experience, the closer the friendship is to dissolve, and, therefore, the higher the rate of decrease of the carrying capacity. Moreover, the higher the previous strength of commitment, the more difficult for this friendship to dissolve, and, therefore, the lower the rate of decrease.

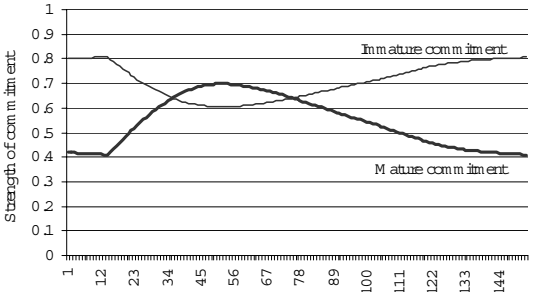
So far, we referred to the case, in which the person reports an immature commitment. Then the mature commitment starts with a rather low strength and, given the right peer-related experience, has full potential of growth. If a person reports a mature commitment, following our reasoning, we can safely assume that this person has had previous peer-related experiences. These experiences will be of the same order as the experience corresponding to a carrying capacity higher than the strength of this mature commitment. Thanks to these experiences, the parent-offspring relationship is already transformed. There is no literature suggesting that a transformed relationship can switch back to its immature form. Therefore, even if no higher-order experience occurs, we will set the minimal value the strength of the mature commitment can reach at the carrying capacity corresponding to the immediately lower than the order of the previous peer-related experience.

Graphs 1 and 2 illustrate the course of the strengths of commitments of persons X and Y. The x-axis represents time in the form of 150 discreet iterations, and the y-axis the strength of the mature and immature commitments. The values of these strengths are calculated for every time step using equations (2) and (7). At any time step, the individual would report the

stronger of the two commitments; the weaker would be an alternative commitment. Person X starts with an immature commitment, meets some people (first-order experience), gets involved in activities with them (second-order experience), at some points expresses his affection for his friends (fifth-order experience), and then continues enjoying their company (fourth-order experience). The result is the dominance of a mature commitment. Person Y starts with an immature commitment, meets some people (first-order experience), goes through to reflecting on his new friends rather early (sixth-order experience), and then retreats from any kind of social activity, apart from meeting some people every now and then (first order experience). The result is the dominance of an immature commitment.



Graph 1. Illustrative example of the course of the strengths of the mature and immature commitments across 150 iterations of person X



Graph 2. Illustrative example of the course of the strengths of the mature and immature commitments across 150 iterations of person Y

Empirically Test of the Model

Empirically testing dynamic systems models requires intensive longitudinal data (for instance, Kunnen & Bosma, 2000). In the Introduction, we explained why we intensively followed a small number of individuals. In this section, we will present the data on these individuals, and we will see whether they provide support for our model. As we described in the Method, we instructed the participants to fill in a diary sheet even on days that no identity-related experience occurred. For days that, despite this instruction, participants have not filled in their diaries, we considered the strengths of the mature and immature commitments to remain unchanged; these days will appear as gaps in the lines describing the course of the strengths of the commitments. If the participants filled in their diaries but no peer-related experience had occurred, the designated decrease in the carrying capacity occurred (see previous section).

Our model is supported if it successfully predicts successfully the course (change or stability) in the strength and content of commitments. We

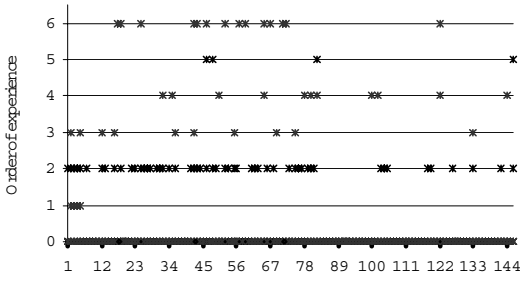
will now explain what we mean by prediction in a dynamic mathematical model. Our model consists of equations (2) and (7) and of the restrictions on the course of the carrying capacity of the strength of the mature commitment as outlined before. Feeding this model with the T1 values of the strength of the mature and immature commitments and the occurrences of the friends-related experiences (that determine the changes in the carrying capacity) leads to an end result comprising the strength of the mature and immature commitments at T2. We shall refer to these strengths as the predicted strengths. The predicted content of the reported commitment depends on the predicted strengths of the mature and immature commitments. If the predicted strength of the mature commitment is higher than that of the immature one, the predicted content of the reported commitment is mature; and vice versa. If the predicted content of the reported commitment, and the predicted strengths of the mature and immature commitments match the observed ones, our data support our model.

Data on T.

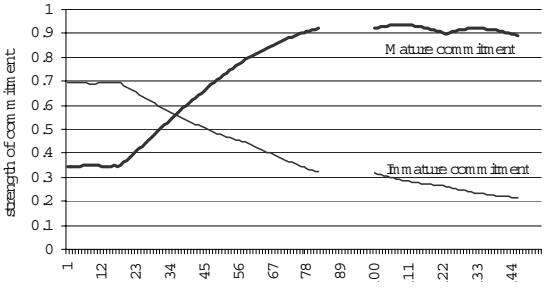
At T1, T. reported the following commitment: "My relations with my parents are in general [rather bad]. I feel lucky because they tried to raise me and instruct me properly. Especially my mother always tries to be emotionally the closest possible to her children, to understand them, and to side them." In her interview, T. reported a rather distant relationship with her father ("My father gives me the impression… that he is not emotionally close to his family") and a rather conflictual relationship with her mother ("With my mother [conflicts] are unavoidable"). Therefore, her commitment was judged immature. The strengths of the reported (immature) and alternative (mature) commitments were .694 and .347, respectively. Recollect that the strength of the reported commitment is the raw score on the relevant scale divided by 36, and the strength of the alternative commitment is given by equation (1). Graph 3a exhibits the occurrence of first- to sixth-order experiences for T. in time and graph 3b the course of strengths of the immature and mature commitments. As was the case in graphs 1 and 2, the x-axis represents time as 146 iterations (one for every day between T.'s first and last days abroad) over which equations (2) and (7) were run to calculate the strengths of the mature and immature commitments (represented in the y-axis).

Our model predicted that, at T2, T. would report a mature commitment. The predicted strengths for the reported (mature) and alternative (immature) commitments were .891 and .215. Indeed, at T2, T. reported a mature commitment: "After my experience in [town], I feel that my relationship with my parents has become more substantial. We communicate better with each other and I feel emotionally closer to them." The empirically derived strengths of the reported (mature) and alternative (immature) commitments

were .917 and .131, respectively, and did not significantly differ from the predicted ones (p>.05; the calculation of these *p* values was described in the Method).



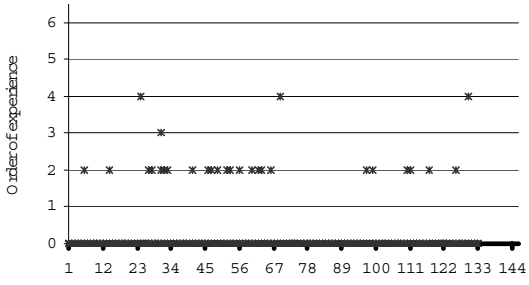
Graph 3a. Occurrence of first- to sixth-order experiences over time in T.'s diaries



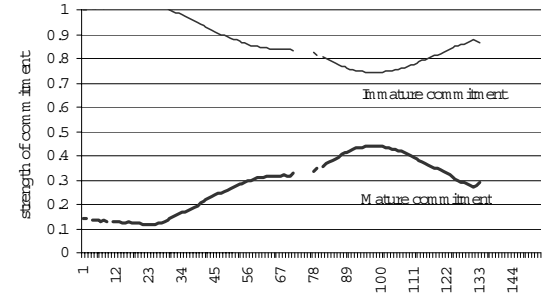
Graph 3b. Simulated course of the strengths of the reported and alternative commitments of V.

Data on A.

At T1, A. reported the following commitment: "Parents are the most important persons in my life. Apart from the material support, they also provide me with emotional support. They are the persons that will always stand by us and that will never betray us. Of course, both sides (parents-children) have to mutually draw back to build a healthy, harmonious, and beautiful relationship." This commitment was judged immature because it exhibits a unilateral relationship where the parents always give, and a picture of the parents as perfect and the most important persons in A.'s life. The strengths of the reported (immature) and alternative (mature) commitments were 1 and .143, respectively. Graph 4a exhibits the occurrence of first- to sixth-order experiences for A. in time and graph 4b the course of the strengths of the immature and mature commitments.



Graph 4a. Occurrence of first- to sixth- order experiences over time in A.'s diaries

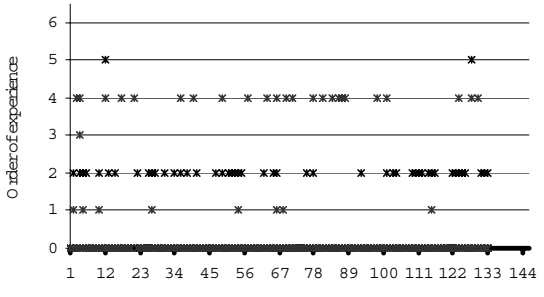


Graph 4b. Simulated course of the strengths of the reported and alternative commitments of A.

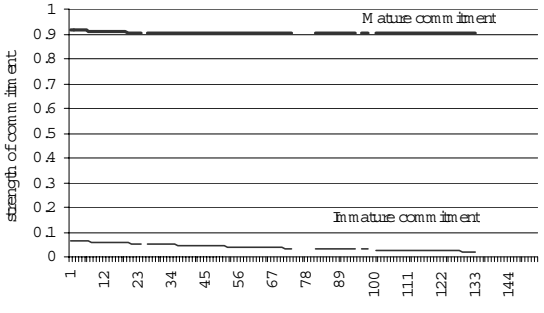
Our model predicted that, at T2, A. would report an immature commitment. The predicted strengths of the reported (immature) and alternative (mature) commitments were .864 and .288, respectively. At T2, A. reported the following commitment: "My relationship with my parents continues to be a relationship of trust, affection, and mutual support. I hope that my stay [abroad] will make them less overprotective. This is the only negative thing that I find in them." This was judged an immature commitment: Although A. stresses the mutuality of the relationship, she admits a sole negative point in her relationship with her parents, and leaves a tone of dissatisfaction from the relationship. The empirically derived strength of the reported (immature) commitment was .833 and did not significantly differ from the predicted one ($p>.05$). The empirically derived strength of the alternative (mature) commitment was .119 and significantly differed from the predicted one ($p<.05$).

Data on E.

At T1, E. reported the following commitment: "I am very satisfied from my relationship with my parents. Now they are both parents and friends, and I know that, whenever I need them, they will stand by me. I appreciate very much the help and support they have offered me without ever becoming indiscreet and without interfering in my personal life and choices." This commitment was judged mature, because it describes a mutual relationship in which E.'s individuality is fully respected. The strengths of the reported (mature) and alternative (immature) commitments were .917 and .065, respectively. Graph 5a exhibits the occurrence of first- to sixth-order experiences for E. in time and graph 5b the course of the strength of the immature and mature commitments.



Graph 5a. Occurrence of first- to sixth- order experiences over time in E.'s diaries



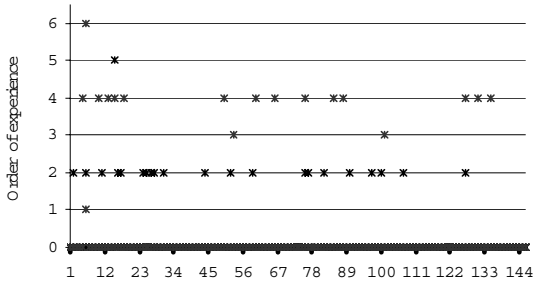
Graph 5b. Simulated course of the strengths of the reported and alternative commitments of E.

Our model predicted that, at T2, E. would report a mature commitment. The predicted strengths for the reported (mature) and alternative (immature)

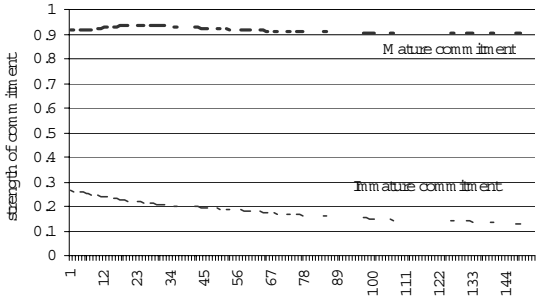
commitments were .900 and .022, respectively. Indeed, at T2, E. reported a mature commitment: "It is a relationship of supporting each other within which each has the freedom of choice and of individual evolution." The empirically derived strengths of the reported (mature) and alternative (immature) commitments were .972 and .069, and did not significantly differ from the predicted ones ($p>.05$).

Data on V.

At T1, V. reported the following commitment: "Parents are certainly models for their offspring. They must both have professional careers, so that they are [full grown] as persons and that they can provide their children with stimuli. Moreover, they have to be present at their children's difficult and good times at any cost." In her interview, V. said: "I am very important for them, they take care of me, they protect me, … and I, on the other hand, worry a lot for them, I want them to have a good time, to be healthy" (mutual relationship). Based on this interview, we judged V.'s commitment as mature. The strengths of the reported (mature) and alternative (immature) commitments were .917 and .262, respectively. Graph 6a exhibits the occurrence of first- to sixth- order experiences for V. in time and graph 6b the course of the strength of the immature and mature commitments.



Graph 6a. Occurrence of first- to sixth- order experiences over time in V.'s diaries



Graph 6b. Simulated course of the strengths of the reported and alternative commitments of V.

Our model predicted that, at T2, V. would report a mature commitment. The predicted strengths of the reported (mature) and alternative (immature) commitments were .902 and .128. Indeed, at T2, V. reported a mature commitment: "My relationship with my parents fortunately continues to be flawless, [I continue] finding in them support, [they continue] respecting my choices and freedoms." This was judged a mature commitment. The empirically derived strengths of the reported (mature) and alternative (immature) commitments were .972 and .068, and did not significantly differ from the predicted ones ($p>.05$).

CONCLUSION- DISCUSSION

Developmental psychologists often assume that characteristics of the parents or of the parent-offspring relationship affect the friendships people develop. A supplementary link, present in theoretical accounts only, is that friendships contribute to the maturation of the parent-offspring relationship. Treating friendships as processes, rather than states, we here suggested a simple process through which building mature friendships triggers a process of transformation of the parent-offspring relationship. We translated this into a mathematical model and empirically tested it. Our findings provide support for this model.

Two of our participants (E. and V.) had a mature and two (T. and A.) an immature commitment towards parents at T1. While abroad, V. and T. reported experiences ranging from meeting people to reflecting on their friendships. E. did not report any reflections, and A. did not report positive emotions for first encounters with people either. Based on these experiences, our model successfully predicted that E., V., and T. would report a mature and A. an immature commitment at T2. The strengths of both the reported and alternative commitments were also successfully predicted for E., V., and T. In the case of A., only the strength of the reported commitment was successfully predicted. The only failure of our model was the prediction of the strength of the alternative commitment of A. at T2.

This failure is more likely to uncover a problem in reconstructing A.'s experience based on her diary data, rather than some deficiency of the model. In particular, only 28 of A.'s 94 peer-related entries fell into categories 1-7 (see Method). It is worth mentioning that 16 of the excluded entries included the emotion of surprise. Surprise is elicited by the disconfirmation of expectations (Gendolla & Koller, 2001), and directs behavior towards the related stimuli (Izard, 1977), possibly not allowing the further processing of other information (compare older theories that emotions interrupt ongoing behaviors and thoughts; Scherer, 1982). For example, A. reported "[W]e went with [the teacher] and the pupils to eat in a … restaurant. I was impressed that the pupils did not offer to pay for us. I think that [they] are too closefisted! Surprise." A. expected to be treated by the pupils but was not. This surprised her, and did not let her report, for instance, whether she enjoyed the dinner.

When describing our mathematical model, we argued for a dynamic systems approach to study processes. Given a bigger number of participants, one could opt for estimating a linear model, which would be simpler. However, except for parsimony, descriptive adequacy is an important criterion when choosing a model: To what extent does a model describe what it is supposed to describe? In this study, we aimed at describing a process. A linear model would allow for predictions of the form "If a person reports an

immature commitment at T1, then the probability that s/he will report a mature commitment at T2 is …%." Such a prediction does not give any insight into the processes that link the T1 and T2 measurements. In a dynamic systems model, prediction refers to whether the starting point (T1 measurement) leads to the final point data (T2 measurement) if the process modeled is applied on it. If it does, the description is adequate.

One last point for the choice of a dynamic systems approach is its use of time. In a linear model, time is treated as continuous, and, thus, change is independent of experiences occurring in time. For instance, one would choose a simple linear model, if T1 and T2 measurements were dependent only on age or only on staying abroad for five months. Our data show that none of this is the case. The participants do not have the same age, and their trajectories are different despite staying abroad for five months. In a dynamic systems model, time is handled as discreet, and the trajectories of individuals depend on their starting points (whether they had a mature or immature commitment before going abroad) and on the experiences they had while abroad. Consider, for instance, that although both T. and A. were 21, they both started with immature commitments and they both stayed abroad for five months, only T. had the experiences needed to reach a mature commitment at T2. This is in line with Elder's (1998) view that the choices and actions of individuals are important for the construction of their life course.

We will now discuss the gender, age, and cultural background of our participants, issues that suggest a high selectivity of our sample. First, the preponderance of female participants is an issue recurring in relationship research (Berscheid & Reis, 1998). We studied only female participants to account for the clear gender differences in relationships (Winstead, 1986) and emotionality (Manstead, 1992); given our small sample, this guaranteed that friendships and emotions would function homogeneously across all cases. In larger samples, male participants should be studied as well. In theory, relationships with parents mature in adolescence. The end of adolescence is not clear-cut, though. For Lerner and Villaruel (1996), in adolescence, "most of a person's biological, psychological, and social characteristics are changing from what is considered childlike to what is considered adult" (p. 130). Given this definition, two of our participants had already achieved an adult commitment concerning parents, while the other two were still adolescents in this respect. This is very likely in southern Europe, where adult-like arrangements of the parent-offspring relationship usually take place much later than in northern Europe (Scabini, 1998). Despite this delay, however, there are no theoretical reasons to believe that the essence of these arrangements is different from those in northern societies.

In designing this study, we took into account the convenience of our participants: They could choose where to be interviewed, which experiences

to report, which emotional terms to use, how often to send their diary entries to the researchers. This resulted in no dropouts and punctuality in filling in the diaries. The originality of the theme, the subsequent lack of previously used instruments, and our concern for the content of the experience and the commitments led us to use mainly open instruments. This was a suitable way to approach the questions raised in this study. On the other hand, coding open diaries and judging the maturity of the commitments on a yes / no basis may have led to losing important information. Taking into account the convenience of both the participants and the researcher requires the construction of easy-to-use instruments that yield easy-to-analyze data before following more participants.

All in all, we made informed decisions on which theoretical ideas to follow, which design to apply, what analyses to conduct, and what kind of conclusions to reach, compromising between theoretical speculations, practical constraints, and our participants' convenience. Suggestions for future research include following more individuals, follow also male participants, better quantifying the variables, and using advanced person-oriented statistical techniques.

The contribution of this study is twofold. On a theoretical level, we gave a different perspective on the relation between one's relationships with peers and with parents. In particular, we provided support for the hypothesis that creating friendships is an important step in acquiring a mature perspective towards one's parents. On a methodological level, we were explicit on the kinds of relationships we expected between our variables, we simulated these relationships over real time steps, we gave some ideas on how to combine micro- (emotions) and macro- (commitment) processes, and we made suggestions on the use of diaries. We hope that this study provides a good starting point to introduce this new methodology in the study of processes.

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Chapter 5

A dynamic systems approach to the self in adolescence

ABSTRACT

We used a dynamic system approach to describe a process through which friendships, parent-offspring relationships, perceived competence, and reflections on own characteristics allow adolescents to view themselves maturely. We considered emotions as the main informants of the personal relevance of related experience. We expressed this model as a set of difference equations that allowed us to simulate the function of the model and use empirical data to demonstrate its viability. We followed four individuals for five months. At the beginning and end of this period, we administered the Groningen Identity Development Scale; during this period, the participants filled in daily diaries on identity-related experiences and emotions. Our model provides better fit to these empirical data than a series of random models. In conclusion, our model adequately describes the process of identity changes and stability.

This chapter is based on:
Vleioras, G., Van Geert, P. L. C., & Bosma, H. A. (in preparation). “What about my feelings?” The role of emotions in viewing oneself maturely.

INTRODUCTION

Adolescents need to view themselves maturely. Developmental and social psychology abound in constructs related to this task; self development (Harter, 1999) and identity formation (Erikson, 1968) are examples. There are different ways to reach such a view. Here, we describe and test a process through which friendships, mature relationships with parents, perceived competence, and reflections on personal characteristics lead to a mature view of oneself.

A Dynamic Systems Approach

We adopted a dynamic systems approach to describe this process. In traditional approaches, time is reduced to some abstract dimension that uniformly affects the outcomes of processes. For example, we know that the identity status occurrences change over time (Meeus, Iedema, Helsen, & Vollebergh, 1999); the effect of time, however, is unknown. In a dynamic systems approach, we formulate explicit hypotheses about the underlying processes. We can then represent time as a number of discrete steps (time units or occurrence of events; Van Geert, 1994). The predefined process runs across all these time steps yielding an outcome (be it a final measurement or the end state of development). In short, in dynamic systems, the effect of time is explicitly taken into account.

We need to stress here that dynamic systems models have different aims from statistical models (see Cook, et al., 1995). The former describe "how one state develops into another state over the course of time" (Weisstein, 1999, p. 501) but do not test whether this description is accurate. The latter test whether two variables are related but do not give any insight into the underlying process. We used a dynamic systems model to describe a process, and a statistical model to test whether this description is accurate.

Dynamic systems modeling entails three steps. The first is to define the variables and to describe how they act upon one another over time (compare the notion of interaction in traditional statistics; Stevens, 1996). The second is to express this conceptual model mathematically. This step allows the simulation of the process at hand and the formulation of precise predictions. Because theory rarely goes into micro processes, this step entails much educated guessing and scientific intuition. The last step is to empirically test the model. In this study, we proceeded with all three steps. We start by defining our variables.

Commitments towards Personal Characteristics

We study the maturity of individuals' views on themselves by looking at the commitments they hold towards their personal characteristics (Bosma, 1985;

1992). Commitments root in the identity status paradigm (Marcia, 1966), an operationalization of Erikson's (1968) theory of identity in adolescence. Marcia (1966) suggested that the commitments towards ideology and future occupation reflect one's identity. More domains were studied when the researchers thought that they were important (for instance, family-career priorities, Archer, 1989; dating, Grotevant & Adams, 1984). Bosma (1985) asked the adolescents what was important for their self-definition. Personal characteristics were one of these domains.

Commitments towards personal characteristics are the individuals' standpoints towards their appearance, character, and gender. They are comparable to many self-related constructs. Similar to self-representations, self-perceptions, and self-descriptions (Harter, 1999), they refer to characteristics that one can consciously report. Similar to the self-concept as the sum of self-schemata (Baumeister, 1995), they refer to different areas. Similar to self-esteem (van der Meulen, 2001), they reflect one's positive or negative evaluation of oneself. In sum, commitments towards personal characteristics bear clear similarities with other self-related constructs.

Moreover, commitments come with two characteristics from the identity literature. First, identification refers to the degree to which individuals invest in their commitments (Marcia, 1966). A typical identification item is "Are you certain of this commitment?" (Bosma, 1985). Second, commitments give a direction for the future. A typical item measuring this is "My commitment gives me strength for the future" (Bosma, 1985; Meeus, 1996). The sum of these two scores is often viewed as the strength of commitments. However, consider a person strongly identifying with being unattractive and dull; this commitment provides low direction for the future. The moderately high sum of these identification and direction for the future scores inadequately describes the strength of this commitment. To account for such cases, we consider identification and direction for the future distinct.

Maturity refers to the state of being fully developed (Collins English Dictionary, 1983). Children see themselves unrealistically positively. With age, they increasingly perceive positive and negative self-attributes, until, in late adolescence, they view themselves in an accurate and balanced way (Harter, 1999). Accordingly, the content of a commitment towards personal characteristics is *mature* if it reflects a balance between positive and negative self-attributes. A mature content further reflects a positive attitude towards oneself (compare the meaning of self-esteem, Baumeister, 1995). In contradistinction, an *immature* content reflects only positive or mainly negative self-attributes. We consider the content of commitments showing gradual acceptance of negative (positive) characteristics as changing. It is *changing immature* if individuals tend to disregard these characteristics in

favor of an extremely positive (negative) self-image, and *changing mature* if no such tendency is identified, but the positive attitude towards oneself is not consolidated.

Previously, we suggested that identification and direction for the future are important, but distinct characteristics of commitments. Different values of these characteristics represent different probabilities that one will change his/her commitment. We use these probabilities to distinguish between degrees of maturity: The lower the probability of (changing) mature commitments to change towards less mature commitments, the more mature these commitments. Similarly, the higher the probability of (changing) immature commitments to change towards more mature commitment, the more mature these commitments.

If both identification and direction for the future are high, the chances of changing from an immature to a mature or from a mature to an immature content are low; if they are both low, the chances of changing are high. Consider the mature commitment "I think I am an interesting person." Person A scores high in identification but low in direction for the future; person B scores low in identification but high in direction for the future. We think that B is more likely to change towards an immature commitment; that is, identification is more important than direction for the future in estimating the chances of changing one's commitment.

So far, we explained how we use the content of commitments towards personal characteristics, and the scores in identification and direction for the future to derive the commitment maturity. Assume that M_t is the degree of this maturity at time t. If time is not important, we use M without the subscript t. We will now describe the growth of M in time (see Van Geert, 1994). First, any growth process depends on factors that have a positive effect on it. This positive effect can be summarized by the term resources, in accordance with the use of this term in ecology. Resources, thus, refer to the factors that support growth. For instance the resources for the growth of plants are oxygen, water, and sun; and those for the growth of knowledge are books, time, and effort. We assume that the resources needed for the growth of maturity of commitments toward personal characteristics are the ones provided by relationships with parents, by friendships, by perceived competence, and by reflections on own characteristics. Equal amounts of resources yield equal growth levels; the more the resources available, the higher the growth level. When all the available resources are consumed, the growing variable stabilizes. The amount of resources corresponding to this stable value is called carrying capacity (K; Van Geert, 1994).

The presence of resources alone does not explain growth. There must be a mechanism that uses the resources to actually cause the growth of maturity. For the sake of building our model, we do not need to know the exact

mechanism; two points are enough. First, individuals differ in the effectiveness of using these resources for growth; thus, some grow faster than others. Second, growth depends crucially on the current size or properties of the growing variable. This is an important difference from additive change models, in which growth takes the form of adding some fixed or variable amount to the level that is already achieved. These principles can be summarized as follows:

$$\Delta M / \Delta t = f(M, r, K) \quad (1)$$

Equation (1) says that the change in maturity (ΔM) over a period Δt is a function of maturity itself, of a growth rate relationship, and of a collection of resources that takes the form of a carrying capacity K. The standard way of expressing the form of this function (see, for instance, Case & Okamoto, 1996; Olthof, Kunnen, & Boom, 2000; Van Geert, 1994) is by means of the equation:

$$M_{t+1} = M_t + M_t * r - M_t * r * M_t / K \quad (2)$$

Equation (2) says that M at t+1 equals M at t plus the quantity [M_t*r] minus the quantity [M_t*r*M_t/K]. The quantity [M_t*r] equals M at t multiplied by some growth rate r: The higher the growth rate, the faster the growth. The quantity [M_t*r*M_t/K] is the quantity [M_t*r] multiplied by the "damping parameter" (Case & Okamoto, 1996, p. 164) [M_t/K]. When M approaches its maximum value, given the carrying capacity K, this ratio increases, allowing smaller increases in M. When M equals this maximum value (M_t=K), the growth stops.

Resources for a Mature View on Oneself

We assume that, in order to view themselves maturely, individuals need to have friends and mature relationships with their parents, to feel competent, and to reflect on their personal characteristics. These refer to the components of the carrying capacity of M. We use K_f, K_p, and K_n to denote the components related to friends, to parents, and to non-relational issues (competence and reflections), respectively. The overall carrying capacity K is then:

$$K = w_f * K_f + w_p * K_p + w_n * K_n \quad (3)$$

where w_x denotes the importance of each of these components for the individuals.

Why these components? The importance of relationships for the self is widely supported (e.g., self-in-relations theories; see Batgos & Leadbeater, 1994). We assume that relationships are important in two ways: Relationships grant individuals with relational provisions and with the space they need to develop as individuals (compare the concepts of connectedness and individuality, Grotevant & Cooper, 1986; and of attachment and autonomy,

Noom, Dekovic, & Meeus, 1999). Friendships are voluntarily built personal relationships that provide intimacy and assistance to their members, who like each other and seek each other's company (Fehr, 1996). Within friendships, adolescents experience increased connectedness (Collins, 1997): They acquire consensual validation of their interests, receive affection, and intimately disclose (Parker & Gottman, 1989). Furthermore, friends decreasingly ask for conformity and increasingly tolerate each other's individuality (Steinberg & Morris, 2001). In this context, individuals acquire their sense of being distinct from their relational partners.

Relationships with parents have similar effects. Despite earlier stress on the need for detachment (Hoffman, 1984), recent theories (Grotevant & Cooper, 1986) and empirical findings (O'Connor, Allen, Bell, & Hauser, 1996) suggest that parents remain important for their adolescent children. For instance, adolescents with warm and supportive relationships with parents are more socially competent (Steinberg & Morris, 2001). However, the parent-offspring relationship transforms to allow the offspring to develop as individuals. The parents accept that adolescents can have their own views (Youniss & Smollar, 1989). Adolescents realize the weaknesses (Orvin, 1995) and fallibility of their parents (Youniss & Smollar, 1989). The relationship itself transforms from complementary and unilateral into symmetrical (Knap, 1984), mutual (Graber & Brooks- Gunn, 1996), and egalitarian (Steinberg & Morris, 2001).

Relationships with friends and parents are processes rather than states (see Duck & Sants, 1983). As such, they have an important difference. The former are voluntary (Collins, 1997). People meet others, choose to whom to express their attraction, start sharing less personal or intimate activities, and continue with exchanging more personal information. At any time, friendships may stop developing, switch to earlier stages, or dissolve (Berscheid & Reis, 1998; Blieszner, 1989). We assume that the deeper the friendships of adolescents, the more the resources these provide for the maturity of commitments towards personal characteristics. Assume that D is the depth of friendships, then:

$$K_f = f(D) \qquad (4)$$

The parent-offspring relationship, on the other hand, is involuntary (Collins, 1997). We assume that the more mature the relationship, the more resources it provides. Maturity of and satisfaction from this relationship are distinct. In a mature relationship, both parties acknowledge each other's strengths and weaknesses. Nevertheless, if communication is problematic, parents and/or children can be dissatisfied. Also, parents and/or offspring may be satisfied from an enmeshed (immature) relationship, where children do not develop autonomous behavior (see Dubas & Petersen, 1996). Adolescents derive

maximal resources from mature and satisfactory relationships and minimal resources from immature and dissatisfactory relationships. We assume that mature but dissatisfactory relationships provide more resources than satisfactory but immature ones. Assuming that Mp and S are the maturity of and satisfaction from the parent-offspring relationship:

$$K_p = f(Mp, S) \quad (5)$$

Self-related constructs have also non-relational roots. For instance, part of the self-concept refers to one's perception of personal abilities (Wylie, 1974). Findings, as well, exhibit that competence is related to self-worth (Harter, 1999). Therefore, we consider perceived competence an important aspect of K_n. Furthermore, the identity literature has focused on actively thinking over one's commitments (for instance, Meeus, 1996) as a mechanism of commitment formation (Berman, Schwartz, Kurtines, & Berman, 2001). We expect people to reflect on their personal characteristics if they change their commitments, or if they try to support the ones they already hold (compare Luyckx, Beyers, Goossens, & Soenens, 2004). In sum, assuming that PC is the perceived competence and Rf the reflections on personal characteristics:

$$K_n = f(PC, Rf) \quad (6)$$

We use emotions as an index of the course of the carrying capacity components in time. Emotions result from subjectively appraising objective situations (Frijda, 1993), and convey information on the personal relevance of these situations (Mellers, 2000). Emotions thus represent reality from the individuals' perspective. This is at least equally (Bronfenbrenner, 1977), if not more psychologically consequential (Engels, Finkenauer, Meeus, & Dekovic, 2001) than objective reality. Initial encounters with people are the first step for building friendships if they cause positive emotions. Being away from parents signifies a mature parent-offspring relationship if the adolescent feels comfortable, but an immature relationship if s/he feels lonely. Finally, succeeding in an exam signifies perceived competence if it causes satisfaction. We will define the effects of emotions on K_f, K_p, and K_n in the Results section.

In this section, we explained why we consider friendships, mature parent-offspring relations, perceived competence, and reflections on own characteristics necessary for achieving a mature commitment towards personal characteristics. In terms of our dynamic systems thinking, these refer to the components of the carrying capacity (K in equation (2)). We also outlined why we will use emotions as an index of the course of these components in time.

Changes in the Carrying Capacity: In what Context?

Empirically testing our model validly necessitates taking dense measurements. For economic reasons, we needed a context where changes in maturity were expected in a relatively short period (see Elder, 1998). Temporarily studying in a foreign country is such a context. We followed the effects of such temporary switches in the context of the Socrates/Erasmus exchange program. We expect participating in this program to affect the maturity of commitments towards personal characteristics, because it affects the carrying capacity components (see Van Geert, 1994): Leaving home is a turning point in the parent-offspring relationship (Golish, 2000). Communication with hometown friends decreases, and new friendships are formed (Johnson, Staton, & Jorgensen-Earp, 1995). Finally, moving away involves several stressors (see Fisher, 1990) that require functioning more effectively. For these, we expect the Socrates/ Erasmus program to be an appropriate context to empirically test our model.

Aims of the Present Study

So far, we defined our variables and how they act upon one another across time. We also expressed these mathematically. From now on, we will aim at:

1. Expressing mathematically the effect of emotions on the carrying capacity components;
2. Finding meaningful values for the parameters used in our model; and
3. Empirically testing our model.

METHOD

Overview of Methodological Design

The participants completed daily diaries on their experiences while participating in the Socrates/Erasmus program. Before (T1) and after their stay abroad (T2), we interviewed them on their commitments towards personal characteristics, their relationships with their parents, and their friendships.

Sample

We followed four Hellene female psychology students. None had emotional problems. T., 21, was in her fourth study year. Her parents were university graduates and fully employed. Before leaving for abroad, she lived with her parents and two of her three siblings. A., 21, was in her third study year. Her parents were university graduates and fully employed. Before her stay abroad, she lived with her parents and two siblings. E., 21, was in her fourth study year. Her parents were high school graduates. Her father was fully employed, and her mother was retired. Before leaving for abroad, she lived

alone in a city 200 km away from her parents and sibling. V., 20, was in her third study year. Her parents were high school graduates. Her father was fully employed, and her mother was a homemaker. Before her stay abroad, she lived with one of her siblings in a flat underneath the flat of her parents and other two siblings.

Measures

We administered an interview to measure the T1 and T2 degrees of maturity of commitments towards personal characteristics and the T1 values of the carrying capacity components. We used a diary to collect information on the emotions related to friends, parents, and non-relational aspects of the self. We will now present these measures.

T1 and T2 maturity of commitments towards personal characteristics

We used the Groningen Identity Development Scale (GIDS; Bosma, 1985), which taps on the domains of personal characteristics, parents, friendship, intimate relationships, future occupation- leisure- school, and philosophy of life. We will here refer to the first domain. First, we interviewed the participants on their appearance, personality, and gender: What do you think about your appearance? Name some characteristics of your personality that you like/ don't like. You are a woman; what do you think about this? At T2, these questions referred to the period abroad. We concluded this interview asking: "How would you summarize your view on yourself?" The qualitative answer to this question is the content of the commitment. Then, the participants answered to 32 questions on a 0-2 scale. We will use the items measuring the degrees of identification and of direction for the future (alpha coefficients in the original version .67 and .86, respectively).

We then transformed these data into a maturity measurement. Recollect that we use the content of commitment (immature, changing immature, changing mature, mature), and the scores in identification and in direction for the future (in this order) to determine the degree of maturity. Because of our small sample size, we used the raw scores in the scales of identification and direction for the future (see Hofstee & Hendriks, 1998). We grouped them in five intervals: very low, rather low, intermediate, rather high, and very high. This grouping leads to (4 levels of content maturity) x (5 identification intervals) x (5 direction for the future intervals)= 100 intervals of commitment maturity. Note that we assume no overlap between maturity intervals: A commitment with mature content, very high identification, and very low direction for the future is more mature than a commitment with mature content, rather high identification, and very high direction for the future. We

measured maturity on a 0 to 1 scale. Each of the 100 maturity intervals was thus set to correspond to a .01 interval.

T1 values of the carrying capacity components

In the T1 interview, we asked whether any important changes occurred in the participants' lives in the previous months. No such changes had occurred. Therefore, we assumed that the actual friendships and parent-offspring relationship at T1 were good estimates of the components K_f and K_p. We used other parts of the GIDS to gain insight in these issues: Do you have real friends? What do they mean to you? In what ways are your parents important to you? What irritates you about your parents? From the answers to such questions, we derived how many resources related to friends and parents the participants were using at T1: How close were these to the absence of resources (K=0)? To full availability of resources (K=1)? To some theoretical middle point (K=.5)? We then compared the resources of each individual to the resources of the other individuals: Who has more and who has fewer resources available? Based on these considerations, we assigned the T1 values of K_p and K_f. Because we had already used the section of the GIDS on the personal characteristics, we used equation (3) to calculate the initial value of K_n.

Experiences related to friends, parents, and non-relational aspects

We devised a booklet including two diary sheets per day. More sheets were available upon request. The participants completed the date, described the experience, and gave an array of related emotions followed by an intensity score (e.g., sadness-1, joy-3). The participants should complete the diaries daily and use separate sheets for every experience. If nothing noticeable occurred, they should briefly outline their day. We defined experience as "events that you meet or on which you are informed by others, thoughts by yourself or by others, discussions in which you participate or which you attend, etc." We asked for experiences related, in their view, to the domains discussed in the GIDS, and all other important experiences. We further processed entries referring to friends, parents, competence, and reflections on personal characteristics. The participants were free to use any emotional term. A suggestive list rooting from English literature and Hellenic[3] dictionaries was provided.

Procedure

We administered the GIDS (Bosma, 1985) in the last two weeks before the participants' departure for abroad (T1). Then, we gave them the diary and instruction booklet, and asked them to complete some diary sheets before

their departures. They could then discuss about problems that may have appeared. While abroad, about five months, they were completing their diaries daily. They were sending these to the first author regularly. All participants went back to Hellas for a two-week vacation in the middle of the term. Three of them continued completing the diaries during this period. Within maximally two weeks after their final return to Hellas (T2), we administered a parallel version of the GIDS.

Analyses

Coding of diary entries

We first chose the entries in which any of the persons mentioned was a peer. We studied peers rather than friends only, because we were interested in both existing and prospective friends. We considered as peers individuals that were explicitly called friends or that had similar status (students, age mates; see Ladd, 1989), excluding intimate partners. We also included entries referring to a family with which T. reported very good communication, despite the age difference. From these entries, we further processed the ones referring to different depths of friendships. Recollect that a friendship is built when people meet each other, do things together, and exchange personal information. We thought that feeling positive emotions for the presence and negative for the absence of peers, affection towards peers, and positive emotions for reflecting on the course of a friendship show increasing depths of the friendships.

Codes FD1 to FD6 describe experiences corresponding to these depths of friendships. Hereunder, we give the codes, the kinds of experiences described, and examples of related entries:

(FD1) Positive emotions for first encounters with people: “The Welcome Day was… pleasant, because I met many Erasmus students. In the evening, we went out… and I had a wonderful time. Content-3”

(FD2) Positive emotions for shared activities: “I went out with a girl with whom we hang around here, and went to a… party. Content-2, enjoyment-2”

(FD3) Positive emotions for getting to know the others better: “In the evening, … [w]e were discussing with L. and M. They are very nice. It was relaxing and fine. Content-2”

(FD4) Positive emotions for the presence and negative emotions for the absence of specific peers: “These days, I and A. spend most of the time together… I am very happy she is here. Elation-2, trust-3, joy-3” and “Today… we met the Romanian girl… We all three agreed that we miss our families and friends. Sadness-3, worry-2”

(FD5) Affection towards peers: "I got up in a bad mood… I missed much my relatives and friends in Hellas. Sadness-3, worry-2, interest-3, affection-3"

(FD6) Positive emotions for reflecting on the course of friendships: "I like this companionship and friendship I have developed with the guys. Each is busy with their distinct schedule, but we often eat together, spend quite some hours together. I did not have the chance to live such experiences in Athens. Content-3"

Then, we chose the entries referring to at least one of the participants' parents. We distinguished between the entries that showed a mature (code PM) and an immature (code PIM) parent-offspring relationship. Hereunder, we give the codes, the kinds of experiences described, and examples of related entries:

(PM) Such entries described:

- Affection towards parents: "I (am) very impatient about seeing my family and going back home. The more the days I will go back approach, the more I miss them. Impatience-2, love-3"
- Positive emotions for being with the parents: "We went out to eat with the whole family for the first time within the last two months. Joy-3, love-3"
- Weak or mild negative emotions for being away from parents: "… my father and brother left. I will see them again in a month. Worry-2, commotion-2"
- Annoyance for behavior of mother: "[My brother] is very [sick]. I have [to take care of everything] and I also have a godmother and a mother to bother me and to ask me and to suggest what I should do… Irritation-3, discouragement-1, indignation-1, worry-2"
- Increasing importance of peers vs. parents: "We are leaving for Hellas… On the one side, I am very happy I will see my relatives. On the other, I will miss my life and habits in [place]. I will have to keep up with the pace of the family"

(PIM) Such entries described extreme negative emotions for being away from parents: "It is the first time that I missed my parents so much that I started crying… Sadness-3, nostalgia-3, upset-1, worry-3"

Finally, we chose the entries referring to the non-relational aspects of the self. We distinguished entries describing perceived competence (code SPC), perceived incompetence (code SPI), and reflections on perceived change (code SRcha) and on one's negative characteristics (code SRneg). Hereunder, we give the codes and examples of related entries:

(SPC) Entries referred, for instance, to:

- Study-related achievements: "… the marks in a course I expected were announced and… I passed. Joy-3, satisfaction-3"

- Language competence: "… three persons have told me… that I speak good (language). I… also realize that I manage to communicate with others… Content-3, zest-3, satisfaction-3, joy-3"

(SPI) Entries referred, for instance, to:

- Study-related strains: "Studying for the paper (I must submit) on Tuesday and stress because I am left behind"
- Strains for conditions beyond the individuals' control: "The suspense is protracted, my flight was cancelled, and the next flight with free seats is on Thursday! And we have courses and studying, and had to be already in [country]. Strain-2, irritation-3, doubt-2"

(SRcha) For instance: "… I feel so comfortable with V., as if I knew her for years, but this is strange for me because usually I find it difficult to feel comfortable and open up to people. I guess I am relaxed and I feel good. Enjoyment-2, joy-3"

(SRneg) For instance: "Today I learned that half Germans are Catholics and the rest Evangelists… Here, I will learn to associate with people from other religions, trying, though, to evaluate the person and not what s/he believes- but I do not know whether I will make it in all instances. Surprise-3, perplexity-1"

We used the Kwalitan[4] to develop and manage our coding scheme. Using the formula (number of agreements)/(number of agreements + number of disagreements), the interrater reliability over 20% of the diary entries was 91.7%.

Testing the fit of the model

In the introduction, we stated that we use a statistical model to test whether the description of the process at hand is accurate. The setup of our dynamic model[5] dictates that repetitively running it yields a distribution of predicted outcomes rather than a single value. Furthermore, as we have already suggested, the observed outcome is an interval rather than a single value. Assuming that our description is accurate only if there is full overlap between the distribution of the predicted and the interval of the observed variables is not realistic. Rather, we compared this overlap with the overlap between the observed interval and the distributions of the scores predicted by a number of competitive models:

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[4] Software designed for qualitative analysis. See http://www.kwalitan.net

[5] First, the T1 maturity is an interval rather than a single value. Furthermore, our model should not be very sensitive; small variations in the parameters and starting points of the variables should not seriously affect its fit. Therefore, we allowed our parameters and the T1 values of the carrying capacity components to vary by ±5%.

- "Free friends," "free parents," and "free non relational" models. Each of the carrying capacity components varies freely. This tests whether it makes sense to look into the experiences related to friends, to parents, and to non-relational aspects of the self.
- "Free friends experience random," "free friends experience restricted," "free parents experience," and "free non relational experience" models. The effects of the friends-, parents-, and non-relational related experiences were randomized. For the case of friends, we constructed two models: one, in which the effects of the experience were totally randomized, and one, in which these effects were randomized but respecting a number of restrictions (see Results- Effects of emotions on the carrying capacity). This tests whether it makes sense to define the effects of the friends, parents, and non-relational aspects the way we did (see Results- Calibration of the model).

For the statistical tests, we used a Monte Carlo procedure[6] to run these eight models 1000 times per individual. This yielded a distribution of predicted scores per model per individual. We tested the null hypothesis that any differences between each random and the dedicated models are accidental; stated differently, that the two distributions come from the same underlying distribution. We tested this hypothesis as follows:

1. We specified the distributions of the observed scores and the scores predicted by our dedicated model by means of a histogram with 200 bins. We calculated the absolute differences between the frequencies in the corresponding bins of the two distributions. The *chi* value is the average of these differences.
2. We randomly permuted[7] the scores of the distributions predicted by our dedicated and each competitive model to create an imaginary underlying distribution of both distributions. The random permutation simulates the null hypothesis that the two distributions are indistinguishable; that the values from the two distributions can be freely and randomly interchanged.
3. We calculated the *chi* value of this distribution (see step 1).
4. We used the Monte Carlo function to calculate the *chi* value of 1000 underlying distributions (step 3), and compared this to the observed *chi* value (step 1). The *p* value of our null hypothesis is derived by dividing by 1000 the number of times that a *chi* value smaller than or equal to the observed one occurred in these 1000 distributions.

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[6] Part of the PopTools, an add-on for Microsoft Excel for Windows.
[7] The SHUFFLE function under PopTools

Rejecting our null hypotheses would mean that the dedicated model fits our data better than the competitive models.

RESULTS

In this section, we will mathematically express the effect of the experiences (Method section) on the carrying capacity components. We will then describe our empirical data. We will use these to find meaningful values for the parameters used in our equations (calibration of the model). Finally, we will test the fit of our model to the empirical data.

Effects of Emotions on the Carrying Capacity

The depth of friendships reported is important for the K_f in three ways. First, the deeper the friendships, the higher the K_f. Second, if an experience corresponds to less deep friendships than the ones previously achieved, the K_f will decrease. The deeper the friendships previously achieved, the more difficult for these to dissolve and the lower the rate of decrease. Third, the lower the depth exhibited by the new experience, the closer the friendships to dissolve and the higher the rate of decrease. In summary:

- If the reported experience at time t describes a friendship deeper than or equally deep to the one achieved at time t-1,

$$K_{ft+1} = K_{fFDX} \quad (7)$$

K_{fFDX} is the carrying capacity corresponding to friends-related experience of depth X.

- If the reported experience at time t describes a friendship less deep than the one achieved at time t-1, then the K_f at time t+1 will be

$$K_{ft+1} = K_{ft} - K_{ft} * (\text{decrease rate}) \quad (8)$$

The decrease rate is bound to the restrictions described above.

Entries showing a mature relationship with parents shall increase K_p; entries showing an immature relationship shall decrease it. We used the following equation to calculate the values of K_p in time:

$$K_{pt+1} = K_{pt} + K_{pt} * (PM_t * eff_{PM} - PIM_t * eff_{PIM}) * (1 - K_{pt}) \quad (9)$$

K_{px} denotes the value of K_p at time x, PM_t and PIM_t the occurrence at time t of experience showing a mature and an immature relationship (0 for non-occurrence, 1 for occurrence), and eff_{PM} and eff_{PIM} the rates of changes caused by these experiences, respectively. The factor $(1 - K_{pt})$ assures that K_p will not increase further than the maximum value 1.

Similarly, we calculated the values of K_n as follows:

$$K_{nt+1} = K_n + K_n * (SPC_t * eff_{SPC} + SPI_t * eff_{SPI} + SRch_t * eff_{SRch} + SRneg_t * eff_{SRneg}) * (1 - K_{nt}) \quad (10)$$

K_{nx} denotes the value of K_n at time x, SPC_t, SPI_t, $SRch_t$, and $SRneg_t$ the occurrence at time t of SPC, SPI, SRch, and SRneg entries (0 for non-

occurrence, 1 for occurrence; see Method), and eff_v the rate of change caused by experience v on the K_n. The factor (1- K_{nt}) assures that K_n will not increase further than the maximum value 1.

The carrying capacity components decline towards their T1 values in the absence of experience. We modeled this decline by iteratively subtracting small, random values from the values of the carrying capacity components (compare the notion of attractors, Van Geert, 1994).

Description of Data

Maturity of commitments towards personal characteristics

Recollect that each combination of content maturity (immature, changing immature, changing mature, and mature), and of identification and direction for the future scores (very low, rather low, intermediate, rather high, and very high) corresponds to a .01 maturity interval (Method). At T1, T. reported mainly negative self-attributes and dissatisfaction with herself (immature content): “I am quite nervous and insecure. I am concerned to some extent with the others’ opinions on myself. I think that… I am agreeable and easy to discuss with. I can listen to others without trying to impose my opinion. One of [my] drawbacks is that I am rather absolute in certain issues.” Her identification was rather low and her direction for the future intermediate. Therefore, her maturity at T1 was .17-.18. At T2, she reported a, not yet consolidated, positive predisposition towards herself (changing mature content): “I have more self-confidence and I am more sociable… I changed quite much, I got more mature. My physical outlook also changed, but I want to go back to my old outlook.” Her identification and direction for the future were very high. Therefore, her maturity at T2 was .74-.75.

At T1, A. reported only positive characteristics (immature content): “I am satisfied with my appearance, my personality, and my gender. I consider it particularly important for somebody to be reconciled with oneself, because this way s/he can exist and co-exist in harmony. We have to critically consider our negative points and correct them without being disappointed” (note that the second and third sentences refer to A.’s ideal self; see Harter, 1999). Her identification and direction for the future were very high. Therefore, her maturity at T1 was .00-.01. At T2, she reported both positive and negative characteristics, but also a tendency to regain an all-positive view on herself (changing immature content): “In general, I am satisfied with myself. … [A] good relationship with oneself and one’s body is essential for the inner balance and… for the image we show to others. There are definitely points that should be ameliorated, but this does not frighten me but rather activates me.” Her identification and direction for the future were relatively high. Therefore, her maturity at T2 was .26-.27.

At T1, E. reported a positive view on herself and recognized negative aspects (mature content): "Regarding my appearance, I am quite satisfied. I am not preoccupied with changing anything so that the others like me… I always accept the others' critique and I often ask for it… I recognize the good and bad elements (of my personality), and I try to improve myself… I have no problem for being a woman; rather, I am (happy) that someday I may become a mother." Her identification was rather high and her direction for the future very high. Therefore, her maturity at T1 was .94-.95. At T2, she recognized positive and negative aspects of herself, and reported satisfaction (mature content): "My appearance has never been an obsession for me… What is more important is the configuration of my personality and, in general, I am looking for ways to improve myself." Her identification and direction for the future were very high. Therefore, her maturity at T2 was .99-1.00.

At T1, V. reported a positive view on herself and recognized negative aspects (mature content): "I am acquainted with my body and appearance in general, and I have never felt disadvantageous or special. I… represent the average woman of my age and I do not want any particular changes. Regarding my personality, I appreciate that… the others state characteristics of my personality, positive or negative, that actually represent me, and I get steamed up when (they) do not see my objective characteristics." Her identification and direction for the future were very high. Therefore, her maturity at T1 was .99-1.00. At T2, she reported satisfaction from herself and recognized both positive and negative characteristics (mature content): "During my stay there, I found that my outlook became simpler… Regarding my personality, I have the feeling that I showed my real self." Her identification and direction for the future were very high. Therefore, her maturity at T2 was .99-1.00.

T1 values of the carrying capacity components

Recollect that the T1 values of K_p and K_f are based on the data given in the T1 interview. T. reported dissatisfaction with her relationship with her parents, but seemed to have a realistic perspective thereon. A., on the other hand, reported total satisfaction from an enmeshed relationship with her parents. Finally, E. and V. reported being satisfied with their mutual and egalitarian relationships with their parents. We set the initial K_p for T., A., E., and V. to .3, .1, .9, and .95, respectively. The initial K_p was smaller for E. than for V. because E. reported relatively more satisfaction at T2. T. had one, problematic, friendship. A. had also one, but satisfactory, friendship. E. and V. had many satisfactory friendships. We set the initial values of K_f for T., A., E., and V. to .1, .3, .95, and .95, respectively.

We previously stated that we used equation (3) to calculate the T1 value of K_n. We used the T1 maturity as an estimate of the T1 value of K, we set the

values of the weights w_f, w_p, and w_n, and we solved equation (3) for K_n. This calculation yielded values outside the 0-1 range. Setting the T1 value of the K_n to a value higher than the one derived from equation (3) has no further implications. However, setting it to a lower value requires some adjustments.[8] T. viewed herself realistically but negatively, and A. unrealistically positively. We have already said that a realistic unsatisfactory view on oneself is more mature than an unrealistic satisfactory view. Therefore, we set the initial K_n at .2 and .1 for T. and A., respectively. E. and V. had realistic positive views on themselves. We set the initial values of K_n for E. and V. to .90 and .95.

Overview of the diary entries

T. provided entries describing experiences that occurred in 129 days of her stay abroad. The corresponding numbers for A., E., and V. were 124, 123, and 80. Recall that the participants were asked to fill in entries also when nothing remarkable occurred. Following our coding scheme, we did not further process all these entries. The ones processed described experiences that occurred in 102, 52, 76, and 42 days for T., A., E., and V. respectively. Note that, although the percentage of days covered by our coding scheme is not particularly high (ranging from 41.9 to 79.1%), the number of measurement points justify the small size of our sample.

Table 1 presents an overview of the occurrences of the parent-, peer-, and non-relational related entries per individual.

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[8] Assume that w_p=.35, w_f=.45, and w_n=.2.
Firstly, assume that, at T1, K=.1, K_p=.1, and K_f=.2. Then, K_n= -.125 (equation (6)). This value is outside the 0 to 1 range. Because the carrying capacity refers to the maximum value that a variable can reach given these resources, we can easily assume that the carrying capacity is higher than the actual value of the variable. In other words, if K_n is negative, we can reset it to a value higher than 0.
Secondly, assume that, at T1, K=.9, K_p=.8, and K_f=.9. Then, K_n =1.075 (equation (6)). This value is outside the 0 to 1 range. By decreasing this to a value smaller than 1, we also change the range of values that K (and M) can take. Consequently, the predicted and observed T2 maturity scores will be measured on different scales, and will, therefore, not agree. We solved this by subtracting from the observed maturity at T2 the difference between the observed maturity at T1 and the sum of products $w_f*K_f+w_p*K_p+w_n*K_n$ for T1.

Table 1. Occurrences of parent-, peer-, and self-related entries per individual

	T	A	E	V		T	A	E	V
FD1	5	0	8	1	PIM	1	4	3	0
FD2	61	26	52	22	PM	7	9	14	12
FD3	10	1	1	2	SPC	1	9	12	5
FD4	7	3	15	7	SPI	40	6	16	0
FD5	4	0	2	1	SRch	5	1	0	0
FD6	14	0	0	1	SRin	2	4	0	0
					SRneg	0	5	0	0

Note. For the meaning of codes, see Method

First, we defined the growth rate r in equation (2). If r is too low, no change occurs. If it is too high, a chaotic pattern emerges. Setting r to .1 yields a smooth curve. In equation (3), we defined the weights of the carrying capacity components as follows: We know that both parents and friends are important relational partners in adolescence (Meeus, 1989; 1994) and that relational domains are more important than non-relational ones (Harter, 1999). Because individuals are expected to spend more time with friends than with parents while abroad, we set a slightly higher weight to friends. We set w_p, w_f, and w_s to .35, .45, and .20, respectively. For A., these values were .4, .35, and .25, respectively, because A. placed parents higher than anybody else in her life, her parents had taught her not to trust friends, and she appeared more preoccupied about herself than the other participants (compare the number of reflection entries). Because these weights needed to sum up to 1, they were not allowed to vary by ±5%.

Regarding equation (7), we defined the K_f corresponding to each friendship depth (FD1 through FD6) as follows: Experiences FD1 to FD3 show the initial steps of friendship formation and experiences FD4 to FD6 show actual friendships. Therefore, we set the K_f to .15, .30, .45, .50, .80, and 1.00 for experiences FD1, FD2, FD3, FD4, FD5, and FD6, respectively. The parameters defining the decrease rate in equation (8) ranged from .2 to .0003125 and were set following the restrictions described in Effects of emotions on the carrying capacity.

In equation (9), we defined the effects of experiences describing mature and immature relationships with parents as follows: The effects should be relatively large, given the relatively small number of parent-related entries. Because of the theoretically expected maturation of the parent-offspring relationship, we opted for a larger increasing effect. The increasing effect should not cancel out the decreasing effect. Recollect that T. had a realistic negative view on her relationship with her parents. The increasing and decreasing effects were set to .35 and .25, respectively. A. reported an immature but satisfactory relationship. Because of this satisfaction, we

assumed that she would be less willing to change this relationship. Therefore, we set both the increasing and decreasing effects to .3. Finally, E. and V. reported mature and satisfactory relationships. The increasing and decreasing effects were set to .35 and .2, respectively.

In equation (10), we defined the effects of the competence and incompetence entries as follows: Competence entries had a positive effect for T., E., and V., because they support a realistic positive view on oneself. Their effect was negative for A., since they verified her extremely positive view on herself. Since T. had a negative view on herself, the effect of competence entries would be higher than in the cases of E. and V. The effects of competence entries were set to .20, -.01, .05, and .05 for T., A., E., and V. Following the same kind of reasoning, the effects of incompetence entries were set to -.0005, .10, .05, and .05, for T., A., E., and V., respectively. Note the particularly small effect of incompetence entries in the case of T. that is due to the relatively high number of related entries.

Recall that E. and V. did not report any reflections. This agrees with our assumption that individuals reflect on their characteristics if they change or need to confirm their views (see Introduction). We set a positive effect of reflections on change in both T. and A. The effect was lower in A. (.10) than in T. (.30), because of A.'s satisfaction from her view on herself. For T., who had a negative view on herself, reflections on negative characteristics were set to have a small negative effect (-.005), because they support her negative perspective on herself. Such reflections were set to have a larger positive effect (.05) on A.'s K_n, because they question her extremely positive view on herself.

Test of Fit

Table 2 shows the significance tests for the null hypotheses that the distributions of scores predicted by our dedicated models and by each of the competitive models come from the same underlying distribution (see Method- Analyses). Our null hypotheses are rejected in most cases. The scores predicted by the dedicated models do not come from the same distribution as those predicted by the models "free carrying capacity," "free parents," "free friends," "free non relational," and "free non relational experience" for all four participants. The scores predicted by the dedicated model do not come from the same distribution as those by the models "free friends experience random" and "free friends experience restricted" for T., A., and V.. Finally, the scores predicted by the dedicate model do not come from the same distribution as those by model "free parents experience" for T. and A.

Table 2. Observed *chi* values, mean, variance, and lower and higher boundaries of the 95% of the scores of the 1000 simulated distributions, and p-values for comparing the dedicated model witch each of the models "free carrying capacity," "free parents," "free friends," "free self," "free parents experience," "free friends experience random," "free friends experience restricted," and "free self experience" for T., A., E., and V.

Model		Simulated distributions					
		Observed *chi* value	Mean	Variance	Lower percentile	Upper percentile	*p* value
Free carrying capacity	T	5.08	7.52	.01	7.32	7.72	<.001
	A	3.61	6.77	.01	6.54	6.96	<.001
	E	1.41	4.93	.01	4.71	5.16	<.001
	V	6.52	7.42	.01	7.25	7.56	<.001
Free parents	T	5.08	7.52	.01	7.33	7.70	<.001
	A	3.61	6.76	.01	6.57	6.96	<.001
	E	1.41	4.93	.01	4.71	5.15	<.001
	V	6.52	7.41	.01	7.26	7.57	<.001
Free friends	T	5.08	7.52	.01	7.34	7.70	<.001
	A	3.61	6.08	.01	5.87	6.30	<.001
	E	1.41	4.93	.01	4.69	5.15	<.001
	V	6.52	7.41	.01	7.27	7.57	<.001
Free non relational	T	5.08	6.59	.01	6.37	6.81	<.001
	A	3.61	6.78	.01	6.59	6.98	<.001
	E	1.41	4.93	.01	4.71	5.15	<.001
	V	6.52	7.39	.01	7.24	7.54	<.001
Free parents experience	T	5.08	7.43	.01	7.23	7.61	<.001
	A	3.61	6.72	.01	6.52	6.92	<.001
	E	1.41	1.47	.01	1.32	1.65	>.10
	V	6.52	6.36	.01	6.18	6.51	>.10
Free friends experience random	T	5.08	7.50	.01	7.32	7.68	<.001
	A	3.61	6.66	.01	6.45	6.87	<.001
	E	1.41	1.50	.01	1.34	1.68	>.10
	V	6.52	6.61	.01	6.47	6.77	>.10
Free friends experience restricted	T	5.08	7.50	.01	7.29	7.70	<.001
	A	3.61	6.65	.01	6.44	6.86	<.001
	E	1.41	1.57	.01	1.40	1.74	<.05
	V	6.52	6.52	.01	6.37	6.68	>.10
Free non relational experience	T	5.08	7.51	.01	7.30	7.69	<.001
	A	3.61	6.69	.01	6.48	6.89	<.001
	E	1.41	1.67	.01	1.50	1.85	<.001
	V	6.52	7.07	.00	6.94	7.20	<.001

CONCLUSION- DISCUSSION

Studies on self and identity stress the role of relationships and of non-relational aspects for the maturation of one's view on oneself. In this study, we integrated these views into a dynamic systems model. Our basic assumption is that mature relationships with parents, friendships, perceived competence, and reflections on one's characteristics provide the resources one needs to develop a mature view on oneself. This statement allows only for general predictions. Therefore, we expressed it mathematically, and we empirically tested the resulting model. The assumptions we made can be justified on the following grounds.

First, we assumed that participating in an international exchange program affects the maturity of the individuals' commitments towards their personal characteristics. Our data supported this assumption. T. started with a rather low and ended with a rather high maturity. A. started with a very low and ended with a rather low maturity. E. started with a very high and ended up with an even higher maturity. Only V. did not show any change. This is not surprising given V.'s extremely high starting point. Second, we adopted a dynamic systems perspective because we assumed that the effect of time in not linear. Our data supported this assumption. Had we assumed a linear time effect, the variation of the observed individual trajectories would have been interpreted as noise. In summary, we have good reasons to believe that we chose an appropriate context and approach for our study.

We will now discuss the specific assumptions we made for building our model. Recollect the meaning of the carrying capacity: It is the amount of resources that support and maintain the variable at hand. We suggested that it has three components: friends, parents, and non-relational aspects. We tested this assumption by making the carrying capacity independent of these areas (model "free carrying capacity"). Our analyses supported our assumption. In all four cases, the dedicated model predicted the observed scores better than the competitive model. We assumed that everyday experiences, rather than being abroad as such, would affect the carrying capacity components. We tested this by letting the carrying capacity components change independently of related experience (models "free parents," "free friends," and "free self"). Our analyses supported our assumption. In all four cases, the dedicated model predicted the observed scores better than the competitive models.

Finally, we assigned specific values to our parameters based on theoretical expectations, on the specific data provided by our participants, and on intuition. We tested these assumptions by letting the effects of the parents-, friends-, and non relational aspects effects vary freely (models "free parent experience," "free friends experience random," "free friends experience restricted," and "free non relational experience"). Our analyses

supported these assumptions but not in all cases. The dedicated model and the models "free parents experience" and "free friends experience restricted" predict equally well the T2 measurement of E. and V., and the dedicated model and the model "free friends experience random" predict equally well the T2 measurements of V.

This is explained by looking at the starting points of E. and V. Even at the absence of experience showing maturing relationships with parents, friendships, competence, and reflections on oneself, the carrying capacity components could reach minimally their T1 value (Results- Effects of emotions on the carrying capacity). Recollect that both E. and V. started with satisfactory, mature relationships with their parents and with a number of friendships. Because of these T1 characteristics, the values of K_p and K_f remained relatively high irrespectively of the effects of the related experiences. For this reason, the size of the effects of the parent- and friends-related experience does not make any difference in the case of these two participants.

We will now elaborate on the consequences of our dynamic systems process perspective on our method. Describing and empirically testing a process means that we are interested in individual trajectories rather than in mean changes (for arguments for the case studies, see Kroger, 1993; Magai & Hunziker, 1993; Rosenberg, 1989). Studying cases resembles studying stratified samples (see Moore & McCabe, 2003). Here, however, we need to stratify not only on the characteristics of the individuals at T1, but also on the everyday experiences. This is realistic only on an individual basis. Practical constraints forced us to follow and analyze data from four individuals only.

Our sample is not only very small, but also highly selective. We studied Hellene female psychology students aged 20-22 years. Is the value of our findings restricted due to generalizability problems? First, our aim is not generalization in the first place. Rather, we aim at providing a theoretically plausible description of a process and at refining it to better describe our empirical data. In the Introduction, we suggested that dynamic systems modeling entails defining a conceptual model, specifying a mathematical model, and empirical testing. These steps are iterative rather than linear. We started with a very simple conceptual model, mathematically expressed it, and saw that it did not accurately describe all trajectories. We looked at our data, went back to theory, and refined the model accordingly. The model presented here is the final product of this iterative process.

Second, our research is not the only one with sample restrictions regarding gender and field of studies: Females and psychology students participate more often than others in psychological research in general (for instance, Berscheid & Reis, 1998). The age of our participants (20-22 years) would be of concern if identity (and self) formation occurred in adolescence

and adolescence had a definite age limit. First, starting with Erikson (1968), identity formation is considered a life long process. Furthermore, considering adolescence the period within which one's characteristics change "from what is considered childlike to what is considered adult" (Lerner & Villaruel, 1996, p. 130), two participants had already reached adulthood, while the other two were still adolescents (compare also the concept of emerging adulthood; Arnett, 2000).

Finally, we think that the cultural background of our participants does not make them different from their Western age-mates. For instance, we know that the Hellenic youth living in urban areas have individualistic (and, thus, Western-like) values (Georgas, 1989; 1991). Moreover, the youth coming from Southern Europe differs from that coming from the rest of Europe in the timing of the transition to adulthood, rather than in the qualities of this transition (Scabini, 1998). Finally, we based all our theoretical assumptions on Western literature; as we have already discussed, our data show that this assumptions hold in our sample.

In conclusion, we do not argue that our small sample is representative of the population. Actually, large samples may also not be representative of the population either. The advantage of large samples is their statistical power: Smaller effects reach more easily statistical significance. However, given our focus on processes rather than means, statistical power is not an issue in this study. In sum, our conclusion is not that our model represents the population, but that it describes exemplary trajectories of change.

Given the originality of our approach and theme, the subsequent lack of previously used instruments, and our concern for the subjective reality from the individuals' perspective, we used mainly open instruments. This was a suitable way to approach the questions raised in this study. On the other hand, coding the diary entries and deriving the maturity scores was a rather intuitive process. Following more individuals is essential to establish the appropriateness of the coding schemes used here. Last but not least, the peculiarity of our data dictated the use of a statistical analysis that, although based on the same logic, does not rely on the assumptions underlying traditional statistics.

The contribution of this study is twofold. From a theoretical perspective, we combined literature on relationships with parents and friends, on self, and on identity into an integrative dynamic systems framework that describes the process of maturation of one's view on oneself. From a methodological perspective, we introduced a relatively new methodology, in which individual trajectories rather than group means are used for the study of processes. We hope that this study is a good step in applying such an approach in adolescent psychology.

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Chapter 6

Summary of the findings- Discussion

SUMMARY OF FINDINDS

In the introduction, we mentioned that literature suggests different rational processes leading to identity formation. Here, we used a well-researched construct (for instance, Berzonsky, 2003), the identity styles, to show that what is important for the psychological well-being of students is being committed, not the way these commitments were formed (Chapter 2). Having showed this, we conducted a longitudinal study to investigate the course of commitments from a process perspective. We followed four individuals for five months. Parent-related emotions predicted the course of commitments towards parents better than parent-related exploration (Chapter 3). Emotions not directly related to parents (namely, peer-related emotions) predicted the course of commitments towards parents (Chapter 4). Lastly, emotions related to friends, parents, perceived competence and incompetence, and reflections on one's self predicted the course of the maturity of commitments towards personal characteristics (Chapter 5).

DISCUSSION

Theoretical Implications

Chapter 2 gave a first hint about why a focus on rational aspects of identity formation only may be misleading. Here, we will focus on Chapters 3 to 5. The main message of these chapters is that, besides the rational cognitive aspects of identity formation, its emotional aspects need to be studied as well. This section will elaborate on the connection of this message to the existing theory of commitment formation. It will be guided by the following questions: Why are rational aspects preponderant in commitment formation theory? What is usually the position attributed to emotions in the process of commitment formation? Is this position accurate?

Rational cognitive components of the commitment formation have received by far more attention than their emotional counterparts; individuals are viewed as theorists or scientists who deliberately choose among identity alternatives (Berzonsky, 1989). The reason for this can be identified in the preponderance of exploration as a process of identity formation (see Berman, Schwartz, Kurtines, & Berman, 2001). In his seminal work, Marcia (1966) identified exploration as *the* process of formation of commitments in ideology and future occupation. Since then, no elaboration occurred in the identity literature on whether other processes may lead to such commitments. In the career development literature, for instance, Vondracek, Lerner, & Schulenberg (1986) suggested that occupational choice starts early in the individuals' lives, that is, before they are cognitively able to deliberately reflect on these choices.

Later, Marcia's ideas were extended to interpersonal domains, without, again, questioning whether exploration suffices to explain how individuals

are committed with respect to their friendships, relationships with parents, or romantic relationships. However, for instance, theory clearly outlines how individuals' perceptions of their relationships with their parents (what we called commitments towards parents) change in adolescence (see Introduction in Chapter 3), with no mention to exploration as a necessary process. Furthermore, Grotevant (1987) parallels the formation of commitments to the gradual building of commitments in romantic relationships. Overlooking such speculations can be attributed to the identified preponderance of the heavily rational exploration as the process of identity formation. This same reason explains the overlooking of emotions in the identity formation process.

Grotevant (1987) was the first in the identity literature to suggest that emotions may play a role in choosing among alternatives. Starting from this, different emotions have been identified as signaling the initiation, continuation, and ending of the exploration process. In this case, emotions are not disregarded, but are considered only with reference to the exploration process. Actually, the initial aim of the studies reported in Chapters 3 to 5 was to trace these emotions in the exploration process, task that has not been undertaken in previous research. However, it soon became apparent that tracing these emotions in the exploration process was not possible, because no exploration occurred (Chapter 3). Therefore, it can be argued that, at least in some identity areas, reducing emotions to signals of the course of exploration is inadequate. Rather, emotions can be used as informants of the course of commitments directly, that is, not through their contribution to exploration.

Using emotions as informants of the course of commitments does not mean that this course is wholly caused by emotions. Emotions affect motivation (Frijda, 1993; Isen, 1993) and are, therefore, causally related to the course of commitments; for instance, deriving satisfaction from observing changes in oneself motivates the person to seek more changes (see Chapter 5). In addition, emotions are reactions to external (environmental data) and internal (thoughts, somatic conditions) stimuli (Frijda, 1993; Stein, Trabasso, & Liway, 1993). These stimuli are also causally related to the course of commitments. Exposure to the same environment, however, does not yield the same emotional reactions and, therefore, the same commitments. Rather, emotional reactions depend on prior experiences (Stein, et al., 1993) and on current goals (Mellers, 2000). Furthermore, current commitments depend on previous commitments (Kunnen, Bosma, & Van Geert, 2001; also, Chapters 4 and 5). The emotional reactions inevitably lead to new stimuli that inevitably lead to new emotional reactions. Lewis (1995) stress the interconnection of thoughts and emotions, and Frijda (1993) uses the term emotion episodes to

describe the sequences of emotional reactions aroused by any single person-environment transaction.

By questioning the preponderance of exploration in the commitment formation process, we do not argue that people have no active role in this process. Cognitions and emotions are intentional (Stein, et al., 1993). Moreover, individuals affect their experiences. For instance, extraverted people experience objectively more positive events and emotionally unstable people objectively more negative events (Magnus, Diener, Fujita, & Pavot, 1993). Finally, exploration as the active thinking through and into identity alternatives (Marcia, 1966; Meeus, 1996) also yields stimuli that cause emotional outcomes (Grotevant, 1987). Note that exploration is embodied in rather than excluded from our ideas. To sum up, we like to view development from a developmental contextual perspective (Vondracek, et al., 1986): Development depends on the individual, but the context is also important by imposing restrictions to the possible changes.

In sum, the present studies suggested that emotions are important when it comes to predicting the course of commitments. This finding uncovers two interrelated deficiencies of the theory on commitments. First, this relies on exploration as the only process of commitment formation, with a focus on its rational cognitive aspects. Second, when emotions are acknowledged as important, their role is reduced to signal the different phases of the exploration process. The results presented here suggest that emotions should be studied independently of, but also including, exploration.

Strengths of Present Studies- Directions for Future Research

In Chapter 2, we reported a cross-sectional study. Two questionnaires (the Identity Style Inventory and the Psychological Well-Being scales) were translated in the Hellenic language, and administered to a sample of 230 Hellene students. We conducted regression analyses to answer our research question. The main methodological concerns regarding this study refer to the sample studied (only students, preponderance of female participants), and to the low reliability coefficients of the Identity Style Inventory. For a fuller discussion of these limitations as well as the strengths of this study, the reader is referred to the relevant section of Chapter 2. Here, we will focus on the studies reported in Chapters 3 to 5. Because of the innovative design and the exploratory nature of these studies, we made many methodological decisions in an intuitive, although educated, way. This section will discuss which were these decisions and how they should be made in future research.

First, we operationalised identity as the content and strength of commitment in the areas of philosophy of life, school- leisure- future occupation, friendships, parents, intimate relationships, and personal

characteristics (Bosma, 1985). Following Elder (1998), we sought identity changes in a context where such changes were probable, the participation in the Socrates/Erasmus programme. We used the Groningen Identity Development Scale (GIDS; Bosma, 1985) to study changes in the content and strength of commitments. The GIDS was transformed when administered for the second time. We built Excel spreadsheets to conduct statistical analyses on our individual trajectory data and we constructed keys to judge the contents of commitments and code the diary entries (Chapters 3, 4, and 5). Following Oatley and Duncan (1992), we used an open daily diary method to derive descriptions of identity-related experience and emotions. The coding schemes for the diary entries aimed at being objective and exhaustive of the reported experience. When objectivity was at stake, a second rater was used, and interrater reliabilities were calculated.

The content and strength of commitments constituted an adequate operationalisation of identity. The amount of exploration, another variable frequently used in identity research, can easily be mapped on these two variables (Vleioras, 2003). The choice of identity areas to be studied should be refined in future research. Some participants were rather discouraged by the amount of information we requested in the T1 measurement: background information, expectations from participating in the programme, reactions of significant others to their prospective departure, the GIDS. Further, based on the diary entries, it later appeared that it made sense to look into commitments only in the areas of parents and personal characteristics. If the areas to be tapped on had been chosen beforehand, the whole design would have been more convenient for the participants.

Choosing which identity areas to study goes hand in hand with where to look for identity changes. Participation in the Erasmus programme proved fruitful for studying commitments towards parents and personal characteristics. The initial intention was to study friendships and intimate relationships as well. However, it appeared that, although the network of friends was extended while abroad, the commitments towards friendships did not change. Further, the participants did not provide but a minimal number of diary entries related to intimate relationships. Different contexts may prove useful in the study of such areas. Being betrayed by a friend or starting dating are examples.

Using the GIDS for the first identity measurement proved adequate: Questions were clear, commitments were successfully formulated, and the scores in the strength of commitment scales adequately represented the impression given during the interview. For the second measurement, re-writing the interview questions so that they refer to the period between the two measurements did not work very well. Often the participants were bored because they did not have anything new to report. For a third measurement,

not used in the studies reported here, we provided the participants with an overview of the information we were interested in. They were then free to report per identity area. This last version functioned better. The formulation of the commitments and the questionnaire on the strength of commitment worked appropriately in all three measurements. The spreadsheets and coding schemes functioned without problems.

Using open diaries was successful given the breadth of reported experiences. Given these diaries, the coding schemes used here fulfilled their aims of being exhaustive and objective. Future research may deal differently with the measurement of emotions. Here, compromising between the duration of the study and the convenience of the participants, we used daily diaries, acknowledging that an accumulative report of emotions once a day may not be an appropriate representation of the emotional experience of that day. Given a context of shorter duration, different approaches can be used. For instance, when following individuals for some days, the Experience Sampling Method (Czikszentmihalyi, Larson, & Prescott, 1977) could be used, while in a one-session context, such as a challenging an adolescent with contradictory information on an important issue, the video-recall procedure (Gottman & Levenson, 1985) may prove useful.

Future research should also aim at broadening the generalisability of the results (studying male as well as female participants, of different ages, including non-students). When studying more participants, personality variables can be used to predict the occurrence of emotions (Costa and McCrae, 1988), identity styles can be used to predict the openness of commitments to change, and mood may be related to the everyday occurrence of emotions (Mayne & Ramsey, 2001). Measurements of such variables were also taken in the studies conducted here, but the small sample did not allow for enough variation to emerge.

The contribution of this dissertation can be summarised in two points. First, we showed that focusing on deliberate decision making, a dominant trend in identity research, may be an inappropriate way to deal with identity formation (Chapters 2 and 3). Second, we suggested specific microprocesses relating emotions and identity commitments, and we demonstrated that empirical data support these suggestions (Chapters 4 and 5). Conducting the research presented in this dissertation was the result of applying what is being taught in research methodology courses: Learn what other people said about the area, critically approach previous theory and research findings, and see what gaps these leave. In particular, I read literature on identity and identity formation, and I saw that emotions were present in theory but not in research. I hope that this dissertation is a good starting point for filling this gap.

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Samenvatting

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Adolescenten worden geconfronteerd met de taak een identiteit te vormen (Erikson, 1968). Ze moeten beslissen over hun beroep, een keuze maken in welke waarden ze geloven, zich een beeld vormen over hoe ze zich verhouden met belangrijke anderen in hun leven, en zichzelf accepteren zoals ze zijn. In het kader van het identiteitsstatus-paradigma (Marcia, 1966), operationaliseerden we identiteit als beelden, standpunten die individuen hebben ten aanzien van belangrijke thema's in hun leven; zoals toekomstig beroep, religie, vriendschapsbanden, ouders, en persoonlijke karakteristieken (Bosma, 1985; Marcia, 1966; Meeus, 1996). Literatuur gebaseerd op dit paradigma, benoemt deze beelden als commitments.

De literatuur heeft zich voornamelijk gericht op twee eigenschappen van commitments: hun sterkte (hoeveel het individu investeert in deze beelden) en hun inhoud (wat is het beeld; Bosma, 1985; Kroger, 2003; Marcia, 1966). Volgens deze literatuur worden commitments gevormd door middel van actief nadenken over verscheidene alternatieven (dit wordt 'exploratie' genoemd; Berman, Schwartz, Kurtines, & Berman, 2001; Grotevant, 1987). Verdere uitwerking van deze theorie heeft verschillende cognitieve componenten in het proces van exploratie geïdentificeerd (bv. Berman, et al., 2001; Berzonsky, 1990). Wat in zowel de originele theorie als de meeste verdere uitwerkingen ervan ontbreekt, is de mogelijke rol die emoties kunnen spelen in de vorming van commitments. Indien er toch rekening gehouden wordt met emoties, dan worden deze steeds gereduceerd tot slechts signalen van het verloop van het exploratieproces (bv. Archer & Marshall, 1996).

Deze dissertatie richt zich op de rol van emoties in het proces van commitment vorming. De hoofdvragen waarop dit onderzoek een antwoord probeert te formuleren, zijn: Zouden we ons uitsluitend moeten richten op de rationele aspecten van commitment vorming? Hoe kunnen emoties aan dit proces gerelateerd zijn?

Eerst voerden we een cross-sectionele studie uit om na te gaan of de nadruk op de rationele aspecten van identiteitsvorming gerechtvaardigd is (Hoofdstuk 2). Een voorbeeld van een dergelijk aspect is het concept van identiteitsstijlen. Identiteitsstijlen verwijzen naar de sociaal-cognitieve strategieën, waarvan verondersteld wordt dat individuen ze gebruiken wanneer ze identiteitsonderwerpen behandelen (Berzonsky, 1990). We hanteerden het psychologisch welzijn (Ryff, 1989) als een index voor wat belangrijk is voor de individuen. We boden de Identity Style Inventory (Berzonsky, 1992) en de Psychological Well-being scales (Ryff, 1989) aan 230 Griekse universiteitsstudenten aan. Regressie-analyses toonden aan dat het gevormd hebben van een commitment (beeld) belangrijk is voor het psychologisch welzijn, maar de wijze waarop dit commitment gevormd wordt, namelijk de identiteitsstijl, niet. Dit is een eerste aanwijzing dat het

uitsluitend gericht zijn op de rationele aspecten van de identiteitsvorming misleidend kan zijn.

Omdat we de identiteitsvorming als een proces wilden benaderen, volgden we intensief vier Griekse psychologiestudenten gedurende een periode van vijf maanden, waarin ze deelnamen aan een internationaal uitwisselingsprogramma. We beschouwden dit programma als een geschikte context om ons een beeld te vormen van het identiteitsvormingsproces in actie, omdat deelname aan dit programma veranderingen in relationele, maatschappelijke, en culturele variabelen inhoudt, die gerelateerd zijn aan de identiteitsvorming (bv. Erikson, 1968; Grotevant, 1987). Aan het begin en aan het einde van de deelnemers hun verblijf in het buitenland boden we de Groningen Identity Development Scale aan (Bosma, 1985). Dit instrument werd ontwikkeld om de inhoud en de sterkte van de commitments te peilen ten aanzien van zes persoonlijk relevante domeinen: levensfilosofie, ouders, school- vrije tijd- toekomstig beroep, vriendschap, intieme relaties, en persoonlijke karakteristieken. Gedurende hun verblijf in het buitenland vulden de deelnemers dagelijks dagboeken in waarin ze identiteitsgerelateerde ervaringen en de daaruit volgende, of bijhorende, of aan de ervaringen gerelateerde emoties bespraken. Deze gegevens worden besproken in Hoofdstukken 3, 4, en 5.

Hoofdstuk 3 richt zich op het domein van de ouders: voorspelt exploratie veranderingen en stabiliteit in commitments ten aanzien van ouders? Volgens de literatuur over de veranderende ouder-kind relaties in de adolescentie lijkt dit onwaarschijnlijk: tijdens het ontwikkelingsverloop van de opgroeiende adolescenten veranderen de standpunten aangaande hun ouders, waarbij het actief nadenken over deze standpunten geen essentieel onderdeel is (bv. Collins, 1997). Inderdaad, onze dagboekgegevens gaven aan dat exploratie ten aanzien van de ouders zelden voorkwam, en, zelfs indien het toch voorkwam, kon de exploratie het verloop van de gerelateerde commitments niet voorspelen. Echter, positieve en negatieve emoties ten aanzien van ouders voorspelden dit verloop wel succesvol.

Nadat we het potentieel van emoties in het voorspellen van identiteitsveranderingen en –stabiliteit hadden aangetoond, modelleerden we in Hoofdstukken 4 en 5 de mogelijke processen die deze veranderingen en stabiliteit produceren. Hierbij hanteerden we een dynamische systemen (DS) benadering (Van Geert, 1994). Dergelijke benaderingen zijn reeds gebruikt om een brede variëteit aan psychologische processen te modelleren, maar nog niet in het identiteitsonderzoek (met uitzondering van het puur theoretische artikel van Kunnen & Bosma, 2000). Het belangrijkste voordeel van deze benaderingen, in vergelijking met traditionele benaderingen, is dat er expliciet rekening wordt gehouden met het verloop van processen in de tijd.

Meestal veronderstelt de literatuur dat de ouder-kind relaties van invloed zijn op de vriendschappen die de kinderen ontwikkelen (bv. Ducharme, Doyle, & Markiewicz, 2002; Wright, 1999). In Hoofdstuk 4 stellen we een bijkomend verband voor: vriendschappen zijn belangrijk om de ouder-kind relaties te laten groeien (ook Sabatelli & Mazor, 1985). We richten ons op de percepties van deze relatie vanuit het standpunt van de kinderen, wat we hiervoor benoemd hebben als commitments ten aanzien van de ouders. We stelden een DS model op om de veranderingen en stabiliteit in deze commitments te voorspellen op basis van de vriendengerelateerde emoties. We gebruikten de empirische gegevens uit onze longitudinale studie om de zinvolheid van dit model aan te tonen. We concludeerden dat zelfs emoties die niet rechtstreeks gerelateerd zijn aan een identiteitsdomein de commitments ten aanzien van dit domein kunnen beïnvloeden.

Tenslotte belichten we in Hoofdstuk 5 een ander identiteitsdomein, namelijk de persoonlijke karakteristieken, het domein van wat de persoon van zichzelf vindt. Dit domein kan gemakkelijk gerelateerd worden aan de zelf- (Harter, 1999) en identiteitsliteratuur (Bosma, 1985; Marcia, 1966; Meeus, 1996). Iemands standpunt over zichzelf kan verschillende mates van maturiteit hebben. In het geval van extreme immaturiteit ziet iemand uitsluitend de positieve kanten van zichzelf; in het geval van extreme maturiteit ziet iemand ook zijn negatieve kanten, maar heeft toch een overwegend positieve kijk op zichzelf (Harter, 1999). We bouwden een DS model om de verandering in de mate van maturiteit van iemands commitment ten aanzien van persoonlijke karakteristieken (‘zichzelf’) te beschrijven op basis van emoties gerelateerd aan vrienden, ouders, waargenomen competentie en incompetentie, en reflecties over zichzelf. De empirische data van onze longitudinale studie ondersteunden de plausabiliteit van dit model.

De bijdrage van deze dissertatie is tweeërlei (Hoofdstuk 6). Ten eerste toonden we aan dat het zich richten op het doelbewust beslissingen nemen (‘exploratie’) als het enige proces van identiteitsvorming- een dominante trend in het identiteitsonderzoek- een eenzijdige benadering van de identiteitsvorming inhoudt: er moet namelijk ook rekening gehouden worden met emoties. Deze conclusie brengt twee gekoppelde tekortkomingen in de theorie over commitments naar voren: deze baseert zich op exploratie als het enige proces van commitmentvorming met de nadruk op rationele cognitieve aspecten. En, indien emoties toch aandacht krijgen, worden ze uitsluitend gebruikt voor het signaleren van de verschillende fasen van het exploratieproces. Volgens de hier gepresenteerde resultaten zijn emoties belangrijk in de identiteitsvorming en zouden ze onafhankelijk van de exploratie moeten worden bestudeerd.

Ten tweede hanteerden we literatuuronderzoek, “educated guessing,” en intuïtie om specifieke microprocessen voor te stellen en die te relateren aan emoties en identiteitscommitments. We vertaalden deze ideeën in DS mathematische modellen en toonden hun plausabiliteit aan aan de hand van data verzameld door middel van een niet-traditioneel methodologisch opzet: we volgden een klein aantal individuen waarbij we dagelijkse metingen van de doelvariabelen uitvoerden. We beschouwen deze aanpak als de enige juiste wijze om processen te onderzoeken. We hopen dat toekomstig onderzoek naar (ontwikkelings-)processen voort zal bouwen op deze methodologie.

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A bunny rabbit is sitting in the woods, typing on his laptop. A fox comes along, and asks the bunny rabbit what he is doing. The rabbit replies: "I'm writing my PhD thesis on 'Predation by Bunny Rabbits on Foxes and Wolves.'" "Rabbits preying on foxes and wolves? That's counterintuitive!" exclaims the fox. "Perhaps," invites the rabbit, " you'd like to come into my burrow and see my data." The fox follows the rabbit down the rabbit hole; shortly later, the rabbit emerges brushing fox fur from his arm and picking bits of fox out of his teeth, and returns to his typing.

A while later, a wolf comes along, and inquires what the rabbit is doing. "I'm writing my PhD thesis on 'Predation by Bunny Rabbits on Foxes and Wolves'." "But… That's counterintuitive!" exclaims the wolf. "Rabbits don't prey on foxes and wolves. " "Would you like to come down into my burrow and see my data?" invites the rabbit. The wolf follows the rabbit down the hole; shortly later, the rabbit emerges brushing wolf fur from his arm and picking bits of wolf out of his teeth, and returns to his typing. A few minutes later, a grizzly bear emerges from the rabbit hole, turns to the rabbit, and says: "The second chapter looks fine. I'll read the third one next week."

And so, the moral of the story goes that it does not matter whether your research is counterintuitive as long as you have the right supervisor…

Although my research has not been counterintuitive, I *have had* the right supervisors. Designing, conducting, and reporting my doctoral research project, and writing my dissertation has been a long process, full of ups and downs in terms of mood, productivity, creativity, and decisiveness. My co-promotor, dr. Harke Bosma, has always supported and advised me, asked for clarifications, left me enough space but also set realistic boundaries to my efforts. My promotor, Prof. dr. Paul Van Geert, an expert in the study of processes, has unblocked the process of my study when this was hindered by modeling difficulties, reviewers' reactions, and statistical obstacles.

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CURRICULUM VITAE

Georgios Vleioras was born in Volos (Hellenic Republic) in 1979. In September 1996, he started his Psychology study in the National and Kapodistrian University of Athens. From September to December 1999, he studied as an exchange student in the University of Groningen. He wrote his final year paper on temperament and addiction to work, and graduated in September 2000 with an average of 9.50 out of 10 (“Excellent”). In the course of his undergraduate studies, he was awarded three prizes for his academic performance from the Hellenic Foundation of State Scholarships (IKY). In January 2001, he started his Ph.D. project on the overlooked link between identity and emotions. The Public Benefit Foundation Alexander S. Onassis granted him a scholarship for the needs of his doctoral studies (September 2001 until March 2005).